

# Vantage Titan



**Made for Life**

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THESE TOSHIBA PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT AGREED UPON BETWEEN TOSHIBA AND THE CUSTOMER. THESE SITE PLANS ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES.

DATE: 01-07-08

SCALE: **NOT TO SCALE**

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DRAWN: **CSP**

QUOTE N/A

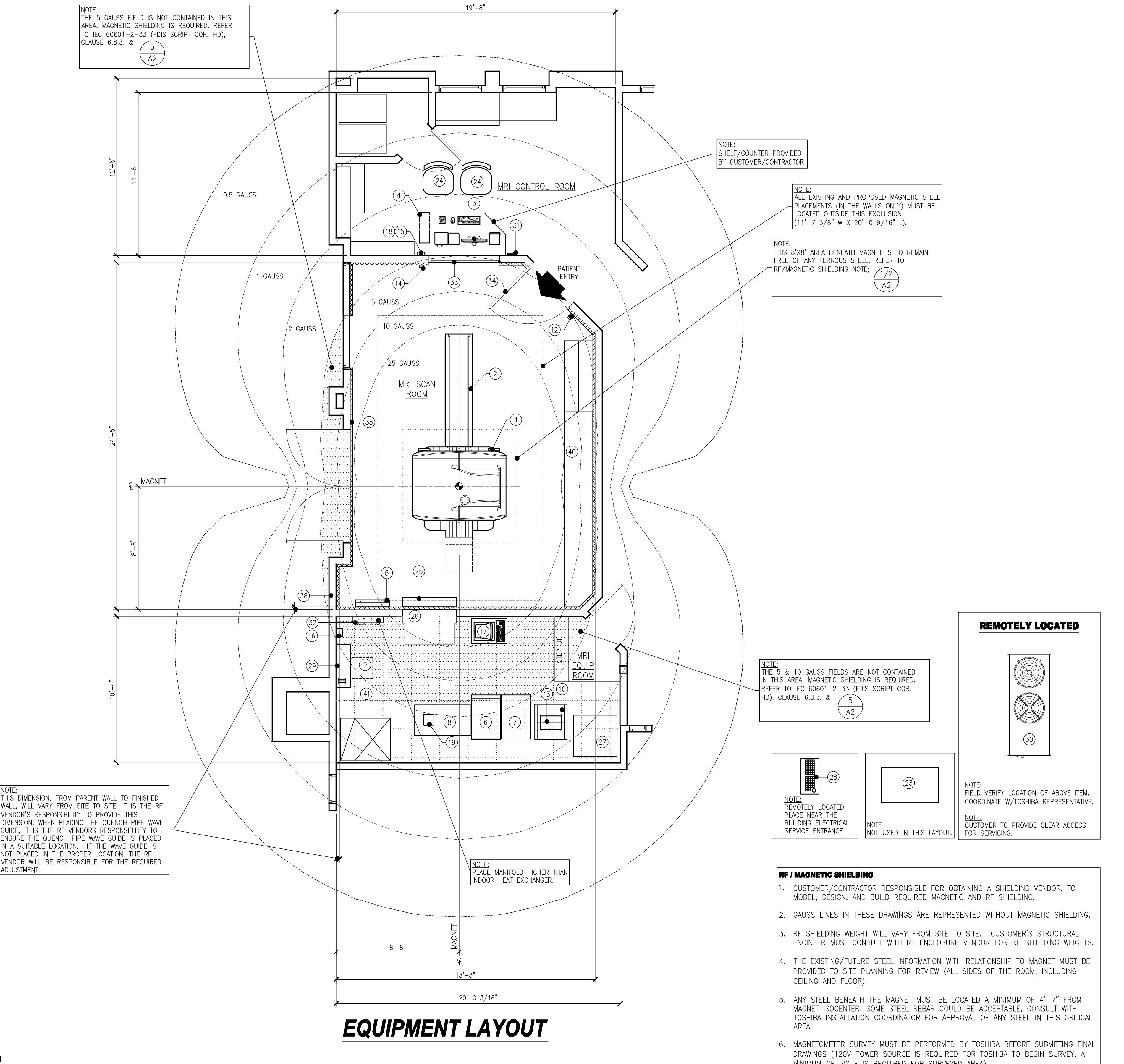
PROJECT NO

## **TYPICALS**

C1

<p>PROJECTS: _____</p> <p>EQUIPMENT DELIVERY DATE: _____ INSPECTED BY: _____</p> <p style="text-align: center;">IN ORDER TO ENSURE A TIMELY AND SUCCESSFUL INSTALLATION, IT IS NECESSARY TO COMPLETE THIS FORM PRIOR TO INSTALLATION. PLEASE ASSIST US BY HAVING THE CONTRACTOR OR YOUR REPRESENTATIVE COMPLETE THE FOLLOWING:</p> <ul style="list-style-type: none"> <li>— 1. ALL WALLS, FLOORS, AND CEILINGS FINISHED. WALLS PAINTED, FLOORS TILED, AND CEILING GRID WORK AND FIXTURES INSTALLED.</li> <li>— 2. MONOLITHIC OR LAY-IN CEILING? PLEASE CIRCLE ONE. ALL MATERIALS IN SCAN ROOM MUST BE NON-FERROUS.</li> <li>— 3. DOORS AND WINDOWS INSTALLED AND LOCKABLE. DOORS TO BE REMOVED PRIOR TO DELIVERY BY CUSTOMER OR CONTRACTOR AND REINSTALLED AFTER EQUIPMENT MOVE-IN. RESERVE SECURE ROOM FOR STORAGE DURING INSTALLATION.</li> <li>— 4. AREA SET ASIDE FOR EQUIPMENT RIGGING AND MOVE-IN (INCLUDING MAGNET OPENING IN SCAN ROOM). ENVIRONMENTAL ISSUES ADDRESSED AND RESOLVED PRIOR TO EQUIPMENT DELIVERY. RECEPTACLE FOR TRASH AVAILABLE (LARGE ENOUGH FOR SHIPPING CRATES IF REQUIRED). EQUIPMENT (ENGRSS) ROUTES ARE CLEAR AND OBSTACLE FREE.</li> <li>— 5. ALL CONDUIT, TROUGHING (WITH COVERS), AND BOXES INSTALLED (CLEAN AND DUST FREE). GROMMETED OPENINGS, CHASE NIPPLES AND RACEWAY DIVIDERS, ETC., COMPLETE.</li> <li>— 6. INCOMING POWER (PER POWER QUALITY REQUIREMENTS) OPERATIONAL AND CONNECTED TO ROOM BREAKER(S).</li> <li>— 7. LOCATION OF ALL ELECTRICAL BREAKERS IN POWER CHAIN NOTED.</li> <li>— 8. ALL CONTRACTOR-INSTALLED STRUCTURAL SUPPORT DEVICES INSTALLED AND LEVELED ACCORDING TO TAMS SPECIFICATIONS ON SITE PLANS.</li> <li>— 9. ALL CONTRACTOR-SUPPLIED CABLES PULLED AND TERMINATED, INCLUDING GROUND WIRE IN TROUGHING AS SPECIFIED IN THE TOSHIBA SITE PLANS.</li> <li>— 10. DUST-FREE ENVIRONMENT IN ALL RELATED ROOMS.</li> <li>— 11. HEATING AND AIR-CONDITIONING INSTALLED, OPERATIONAL AND STABILIZED PER TOSHIBA SITE PLANS. FILTERS TO BE CHANGED 24 HOURS BEFORE DELIVERY.</li> <li>— 12. ALL MILLWORK COMPLETE AND INSTALLED. ENSURE USE NON-FERROUS MATERIAL FOR ANY MILLWORK IN SCAN ROOM.</li> <li>— 13. COMPUTER FLOORING INSTALLED, IF APPLICABLE.</li> <li>— 14. ALL UNFINISHED AREAS SEALED OFF TO PREVENT DUST CONTAMINATION.</li> <li>— 15. RECEPTACLE FOR TRASH AVAILABLE (LARGE ENOUGH FOR SHIPPING CRATES IF REQUIRED).</li> <li>— 16. "PCDU" INSTALLED AND OPERATIONAL.</li> <li>— 17. PENETRATION PANEL INSTALLED IN SCAN ROOM.</li> <li>— 18. RF ROOM COMPLETE AND TESTED. PROVIDED COPY OF SIGNED TEST RESULTS TO SITE PLANNING.</li> <li>— 19. ALL REQUIRED WAVE GUIDES INSTALLED (INCLUDING MED-GASES, IF APPLICABLE).</li> <li>— 20. PLUMBING FOR CHILLER AND CRYO COOLER INSTALLED FLUSHED AND TESTED.</li> <li>— 21. SEISMIC REQUIREMENTS, AND REQUIRED SEISMIC ANCHORING DEVICES INSTALLED (IF APPLICABLE).</li> <li>— 22. NETWORK CONNECTIONS INSTALLED AND OPERATIONAL.</li> <li>— 23. QUENCH PIPE INSTALLED PER TOSHIBA SPECIFICATIONS (SEE SHEETS M1 &amp; M4). USE ONLY ALUMINUM OR STAINLESS STEEL MATERIAL FOR THE QUENCH PIPE AS WE SHOWN ON PLAN.</li> <li>— 24. ALL APPLICABLE PERMITS OBTAINED.</li> <li>— 25. MAGNETIC/RF SHIELDING DESIGNED, MODELED, AND BUILT.</li> <li>— 26. CHILLER PAD POURED &amp; CURED PER CUSTOMER/CONTRACTOR.</li> <li>— 27. ALL MATERIALS IN SCAN ROOM MUST BE NON-FERROUS.</li> <li>— 28. CLEAN WORK AREA SET ASIDE OUTSIDE PROCEDURE ROOM DOOR AND CONTROL AREA.</li> </ul> <p><b>IF ITEMS LISTED ARE NOT COMPLETED, INSTALLATION TIME WILL INCREASE OR INSTALLATION START DELAYED.</b></p> <p>COMMENTS: _____</p> <p>SIGNED TOSHIBA: _____</p> <p>CONTRACTOR: _____</p> <p>CUSTOMER: _____</p> <p style="text-align: right;">REVISED: 10-11-07</p>	<p><b>PLUMBING NOTES:</b></p> <p>A. IT IS THE CUSTOMER'S RESPONSIBILITY TO INSTALL THE DRAKE CHILLER.</p> <p>B. FOR A 2 LOOP CHILLER SYSTEM (INDOOR UNIT, OUTDOOR UNIT) THE CUSTOMER'S CONTRACTOR SHOULD INSTALL THE INDOOR UNIT IN THE EQUIPMENT ROOM AND THE OUTDOOR UNIT ACCORDING TO THE DRAKE CHILLER INSTALLATION MANUAL.</p> <p>C. THE CUSTOMER'S CONTRACTOR WILL COMPLETE ALL ELECTRICAL AND PLUMBING AS DESCRIBED IN THE CHILLER INSTALLATION MANUAL.</p> <p>D. THE TAMS ZONE SERVICE OFFICE SHOULD SCHEDULE THE CHILLER START UP WITH JOHNSON CONTROLS. THE DRAKE CHILLER PACKAGE INCLUDES CHILLER START UP AND A PM ON THE CHILLER AT 6 MONTHS (BOTH OF THESE ITEMS ARE PERFORMED BY JOHNSON CONTROLS / TRANE AND ARE PREPAID WITH EACH ORDER).</p> <p>E. IT IS THE RESPONSIBILITY OF THE CUSTOMER'S PLUMBER TO FILL THE CHILLER RESERVOIR AND PIPING WITH THE 60/40 GLYCOL MIXTURE (PROVIDED BY TAMS). THE CHILLER RESERVOIR AND PLUMBING SHOULD HOLD APPROXIMATELY 80-110 GALLONS DEPENDING ON THE LENGTH OF THE PLUMBING RUN.</p> <p>F. CHILLER START UP (JOHNSON CONTROLS / TRANE) CONSISTS OF VERIFYING ALL CONNECTIONS, STARTING UP AND VERIFICATION OF CHILLER OPERATION. REFER TO DRAKE INSTALLATION MANUAL FOR CORRECT REFRIGERATION LINE SIZE IN ACCORDANCE WITH CHILLER MODEL NUMBER (EST/SPLIT SYSTEMS ONLY).</p> <p><b>NOTE:</b></p> <p>G. ANCHORING OF DRAKE CHILLER IS THE RESPONSIBILITY OF THE CUSTOMER/CONTRACTOR.</p> <p style="text-align: right;">REVISED: 10-30-07</p>	<p><b>GENERAL NOTES:</b></p> <p><b>GENERAL</b></p> <p>A. TOSHIBA RESERVES THE RIGHT TO CHANGE THESE DESIGNS AND SPECIFICATIONS WITHOUT NOTICE.</p> <p><b>CUSTOMER/CONTRACTOR RESPONSIBILITY</b></p> <p>B. CUSTOMER/CONTRACTOR SHALL SUPPLY AND INSTALL ALL MATERIALS AND OTHER FEATURES SPECIFIED IN THE TOSHIBA SITE PLANS. CUSTOMER/CONTRACTOR SHALL SUPPLY AND INSTALL ALL COUNTERTOPS, SINKS (REFER TO <input checked="" type="checkbox"/> PT), CASE WORK AND CABINETS SPECIFIED IN THE TOSHIBA SITE PLANS.</p> <p>C. ANY CABINETRY THAT MAY BE REQUIRED TO HOUSE VIDEO RECORDERS, MONITORS KEYBOARDS, OR OTHER AUXILIARY EQUIPMENT SHALL BE SUPPLIED AND INSTALLED BY CUSTOMER/CONTRACTOR.</p> <p>D. THESE TOSHIBA SITE PLANS DO NOT INDICATE EQUIPMENT REQUIREMENTS FOR ITEMS NOT SOLD BY TOSHIBA SUCH AS, PHYSIOLOGICAL MONITORS, LASER CAMERAS, INJECTORS, ETC. SPECIFICATIONS FOR THOSE ITEMS MUST BE OBTAINED FROM THE VENDOR AND INCLUDED IN THE DESIGN TOTALS.</p> <p>E. IF REQUIRED, THE CUSTOMER/CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN INTERCOM SPEAKER SYSTEM BETWEEN THE EQUIPMENT ROOM, CONTROL ROOM, AND PROCEDURE ROOM.</p> <p>F. THE CUSTOMER/CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL COSTS REQUIRED FOR THE ENGINEERING AND/OR REMOVAL OF ANY HAZARDOUS MATERIALS SUCH AS ASBESTOS.</p> <p>G. CUSTOMER/CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN OPERATING PHONE IN THE CONTROL ROOM AT THE TIME TOSHIBA EQUIPMENT INSTALLATION BEGINS.</p> <p>H. CUSTOMER/CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE LIGHTING FOR SERVICING OF EQUIPMENT IN ALL AREAS OF THE INSTALLATION.</p> <p>J. PRIOR TO EQUIPMENT DELIVERY AND INSTALLATION, THE SITE MUST BE 100% COMPLETE, CLEAN AND FREE OF DUST. CUSTOMER/CONTRACTOR AND TOSHIBA INSTALLATION COORDINATOR MUST COMPLETE A SITE WALK THROUGH 1 WEEK PRIOR TO DELIVERY AND DETERMINE ACCEPTABILITY FOR DELIVERY.</p> <p>K. CUSTOMER/CONTRACTOR/ARCHITECT SHALL BE RESPONSIBLE FOR PROVIDING THE ENTIRE NETWORKING AND COMMUNICATION SYSTEMS.</p> <p>L. ALL MATERIAL IN SCAN ROOM MUST BE NON FERROUS.</p> <p><b>RF / MAGNETIC SHIELDING</b></p> <p>M. CUSTOMER/CONTRACTOR RESPONSIBLE FOR OBTAINING A SHIELDING VENDOR, TO <u>MODEL</u> DESIGN, AND BUILD REQUIRED MAGNETIC AND RF SHIELDING.</p> <p>N. GAUSS LINES IN THESE DRAWINGS ARE REPRESENTED WITHOUT MAGNETIC SHIELDING.</p> <p>P. RF SHIELDING WEIGHT WILL VARY FROM SITE TO SITE. CUSTOMER'S STRUCTURAL ENGINEER MUST CONSULT WITH RF ENCLOSURE VENDOR FOR RF SHIELDING WEIGHTS.</p> <p>Q. THE EXISTING/FUTURE STEEL INFORMATION WITH RELATIONSHIP TO MAGNET MUST BE PROVIDED TO SITE PLANNING FOR REVIEW (ALL SIDES OF THE ROOM, INCLUDING CEILING AND FLOOR).</p> <p>R. ANY STEEL BENEATH THE MAGNET MUST BE LOCATED A MINIMUM OF 4'-7" FROM MAGNET ISOCENTER. SOME STEEL REBAR COULD BE ACCEPTABLE, CONSULT WITH TOSHIBA INSTALLATION COORDINATOR FOR APPROVAL OF ANY STEEL IN THIS CRITICAL AREA.</p> <p>S. MAGNETOMETER SURVEY MUST BE PERFORMED BY TOSHIBA BEFORE SUBMITTING FINAL DRAWINGS (120V POWER IS REQUIRED FOR TOSHIBA TO BEGIN SURVEY. A MINIMUM OF 50' F IS REQUIRED FOR SURVEY AREA).</p> <p>T. THE SHIELDING WORK IS REQUIRED TO SUPPRESS EXTERNAL LEAKAGE OF THE ELECTROMAGNETIC RADIATION GENERATED BY THE SYSTEM.</p> <p>U. THE SHIELD MUST ATTENUATE ELECTROMAGNETIC RADIATION IN THE FREQUENCY BAND OF 63.86MHz ± 0.5MHz BY AT LEAST 90dB.</p> <p>90dB OR MORE FROM 64.36 MHz TO 70 MHz 90dB OR MORE FROM 70 MHz TO 300 MHz 50 dB OR MORE FROM 300 MHz TO 350 MHz 40 dB OR MORE FROM 350 MHz TO 1 GHz</p> <p><b>CODES AND PERMITS</b></p> <p>V. THE CUSTOMER/CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND ORDINANCES ARE COMPLIED WITH.</p> <p><b>SITE CONDITIONS</b></p> <p>W. DIMENSIONS TO WALLS AND OR OTHER ROOM FEATURES, EXCEPT FOR NOTED COLUMN AND BEAM CENTER LINES SHALL BE FROM FINISHED SURFACES.</p> <p><b>PLUMBING</b></p> <p>X. PLUMBING IS REQUIRED FOR CERTAIN COMPONENTS OF TOSHIBA EQUIPMENT.</p> <p><b>TRANSPORT REQUIREMENTS</b></p> <p>Y. EQUIPMENT INGRESS ROUTE MUST BE CHECKED PRIOR TO EQUIPMENT DELIVERY TO ENSURE THE LARGEST AND HEAVIEST ITEMS OF EQUIPMENT CAN BE ACCOMMODATED. DIMENSIONS OF CORRIDORS SHOULD BE NO LESS THAN 8'-0".</p> <p>Z. RECOMMENDED ENTRANCE TO SCAN ROOM SHOULD BE NO LESS THAN 7'-3" W X 8'-6" H FOR EQUIPMENT DELIVERY. SPECIAL ARRANGEMENTS MAY BE NECESSARY FOR MAGNET DELIVERY, INCLUDING A LARGER OPENING IN THE RF SHIELDING.</p> <p>AA. CONTACT THE TOSHIBA INSTALLATION COORDINATOR FOR DETAILS OF THE LARGEST AND HEAVIEST ITEMS OF EQUIPMENT FOR THIS INSTALLATION.</p> <p>BB. THE MINIMUM WIDTH OF THE DELIVERY PATH, DOORS, CORRIDOR, ELEVATOR ETC. IS 42".</p> <p style="text-align: right;">REVISED: 12-19-07</p>
<p><b>STRUCTURAL NOTES:</b></p> <p>A. THESE SITE PLANS ARE INTENDED TO DEPICT ONLY A CONCEPT OF THE STRUCTURE REQUIRED FOR THE TOSHIBA EQUIPMENT. THE DESIGN OF ALL STRUCTURAL ELEMENTS MUST BE SPECIFIED BY A LICENSED STRUCTURAL ENGINEER IN ACCORDANCE WITH TOSHIBA SPECIFICATIONS AND ALL APPLICABLE CODES.</p> <p>B. THE CUSTOMER/CONTRACTOR SHALL FIELD VERIFY ALL EXISTING AND PROPOSED DIMENSIONS AND SITE CONDITIONS PRIOR TO COMMENCING CONSTRUCTION.</p> <p>C. THE TOSHIBA INSTALLATION COORDINATOR SHALL BE NOTIFIED IN WRITING OF ANY FIELD CONDITIONS ENCOUNTERED THAT ARE CONTRADICTORY TO THOSE SHOWN IN THE TOSHIBA SITE PLANS.</p> <p>D. THE DEMOLITION, FABRICATION AND ERECTION OF SUPPORT STRUCTURES FOR TOSHIBA EQUIPMENT SHALL BE PERFORMED BY THE CUSTOMER/CONTRACTOR IN ACCORDANCE WITH THE DESIGN AND SPECIFICATIONS SET FORTH BY THE STRUCTURAL ENGINEER OF RECORD.</p> <p>E. VANTAGE MAGNET FEET MUST BE INSULATED/ISOLATED FROM SHIELDED ROOM.</p> <p>F. INSULATION/ISOLATION FOR MAGNET FEET TO BE PROVIDED BY CUSTOMER/CONTRACTOR.</p> <p>G. ALL STRUCTURAL MATERIAL IN SCAN ROOM MUST BE NON FERROUS.</p> <p>H. IT'S RF VENDOR'S RESPONSIBLE TO ANCHORING THE MAGNET.</p> <p style="text-align: right;">REVISED: 05-01-06</p>		<p><b>TYPICAL DRAWING</b></p> <p>(MRI) SCAN ROOM – VANTAGE/TITAN)</p>
<p><b>FLOOR LOADING</b></p> <p>THE FLOOR MUST SUPPORT 11,904.96 lbs. FOR THE MAGNET, INCLUDING THE COVERS AND THE GRADIENT COIL. THE COMPLETE FLOOR MUST WITHSTAND A MAXIMUM CONCENTRATED MAGNET LOAD OF 3,796.04 lbs. PER SQUARE FOOT (2,976.24 lbs. PER MAGNET FOOT). THE FLOOR MUST BE ABLE TO WITHSTAND BOTH THE MAGNET AND THE WEIGHT OF THE MAGNETIC SHIELDING.</p> <p style="text-align: right;">REVISED: 12-08-05</p>		<p>DATE: 01-07-08</p> <p>SCALE: NOT TO SCALE</p> <p>DRAWN: G.S.P.</p> <p>QUOTE: N/A</p> <p>PROJECT NO.</p> <p><b>TYPICALS</b></p> <p><b>GN</b></p>

**FOR REFERENCE ONLY. NOT TO BE USED FOR CONSTRUCTION PURPOSES.**



## EQUIPMENT LEGEND

ITEM	ELEC. SYM.	ITEM DESCRIPTION SUPPLIED / INSTALLED BY TOSHIBA	RMBTU / HR.	WEIGHT	REF.
①	MAG	MRT-1504/S3 SUPER CONDUCTING 1.5 TESLA MAGNET	P	4,094.57	11,904.96
②	PCH	PATIENT COUCH	P	0.00	617.29
③	CON	WIDESCREEN LCD, CONTROL PAD, AND CONTROL BOX	C	682.43	31.53
④	HOSC	HOST CABINET	C	1,706.07	55.12
⑤	WLC	WALL CABINET	P	341.21	132.27
⑥	RFC	RF CABINET	E	2,050.00	661.39
⑦	RFAC	RF AMP CABINET	E	10,246.00	661.39
⑧	GACC	GRADIENT POWER SUPPLY AND CONTROL CABINET (TITAN)	E	20,472.85	2,094.39
⑨	RFG	REFRIGERATOR CABINET (BELOW INDOOR CHILLER UNIT)	E	11,260.07	198.42
⑩	TFR	TRANSFORMER CABINET	E	2,729.71	573.20
⑪	CAM	PATIENT OBSERVATION SYSTEM CAMERA (NOT SHOWN)	P	0.00	4.41
⑫	SUVS	SUPERVISORY UNIT SWITCH	P	0.00	0.88
⑬	SUVU	SUPERVISORY UNIT (MOUNTED ON "TFR")	E	0.00	26.46
⑭	OXMS	OXYGEN MONITOR SENSOR	P	0.00	0.44
⑮	OXMM	OXYGEN MONITOR SYSTEM MONITOR	C	0.00	0.44
⑯	FLS	FLOW SWITCH	E	0.00	11.02
⑰	INV	INNERVISION (17" MONITOR, KEYBOARD AND PC) ON CART SUPPLIED BY CUSTOMER/CONTRACTOR	E	732.00	49.50
⑱	FSB	FAN SWITCH BOX	C	100.00	2.20
⑲	ECGB	ECG GATING - BASE BAND UNIT	E	---	2.65
⑳	SPK1	CONTROL ROOM SPEAKER (NOT SHOWN)	C	---	---
㉑	SPK2	SCAN ROOM SPEAKER (NOT SHOWN)	P	---	---
㉒	FAN	WB COIL COOLING FAN BOX, MOUNTED TO SIDE OF "LFB2" (NOT SHOWN)	E	341.52	6.61

### OPTIONAL ITEM DESCRIPTION SUPPLIED / INSTALLED BY TOSHIBA

㉓	TBL	FREESTANDING TABLE FOR MONITOR AND KEYBOARD	O	0.00	---	8
㉔	CHR	SWIVEL CHAIR (2 SHOWN)	C	0.00	N/A	---

### OPTIONAL ITEM DESCRIPTION SUPPLIED BY TOSHIBA / INSTALLED BY CUSTOMER / CONTRACTOR

㉕	LFB1	LINE FILTER BOX (SCAN ROOM SIDE)	P	0.00	132.28	7
㉖	LFB2	LINE FILTER BOX (EQUIPMENT ROOM SIDE)	E	0.00	220.46	7
㉗	VRDU	VOLTAGE REGULATING DISTRIBUTION UNIT	E	20,800.00	2,200.00	6
㉘	TRNS	STEP-UP TRANSFORMER	R	2,500.00	1,000.00	8
㉙	IHE	DRAKE INDOOR HEAT EXCHANGER (EXACT HEIGHT TO BE DETERMINED)	E	1,500.00	130.00	2
㉚	OCU	DRAKE OUTDOOR CHILLER UNIT	R	12,800.00	1,900.00	1
㉛	RMP	DRAKE REMOTE MONITORING PANEL	C	---	---	3
㉜	MFOLD	MANIFOLD AREA (FIELD VERIFY LOCATION)	E	0.00	80.00	6

### ITEM DESCRIPTION SUPPLIED / INSTALLED BY CUSTOMER / CONTRACTOR

㉖	RFW	RF SHIELDED WINDOW – SITE SPECIFIC PER ROOM CONDITIONS	P	---	---	---
㉗	RFD	RF SHIELDED DOOR – SITE SPECIFIC PER ROOM CONDITIONS	P	---	---	---
㉘	RFS	RF SHIELDED ENCLOSURE – SITE SPECIFIC PER ROOM CONDITIONS (THICKNESS VARIES PER MANUFACTURER)	P	---	---	---
㉙	HVAC	AIR CONDITIONING UNIT – VERIFY LOCATION (NOT SHOWN)	O	---	---	---
㉚	PAD	CONCRETE PAD FOR OUTDOOR CHILLER UNIT (NOT SHOWN) MINIMUM SIZE 3'-8" X 7'-11"	R	---	---	---
㉛	WALL	PARENT WALL	P	---	---	---
㉜	CB	CIRCUIT BREAKER (NOT SHOWN)	E	---	---	---
㉝	NFCC	NON-FERROUS COIL CABINET	P	---	---	---
㉞	CF	RAISED COMPUTER FLOOR	E	---	---	---

### SYSTEM ELECTRICAL REQUIREMENTS FOR VANTAGE/TITAN MRI SYSTEM

SUPPLY CONFIGURATION: 3 PHASE DELTA OR WYE CONNECTED, 140kVA SERVICE

SUPPLY VOLTAGE: 208V – 600 AMP

VOLTAGE VARIATION: ±10%

REvised: 01-07-08

### SITE PLAN APPROVAL

PLEASE REVIEW, SIGN AND RETURN THIS SET TO HEADQUARTERS BEFORE FINAL PLANS. IF THERE ARE ANY CHANGES, PLEASE INDICATE ACCORDINGLY ON THIS SET.

CUSTOMER: DATE:

SALES: DATE:

I.P.M.: DATE:

### \* HVAC REQUIREMENTS

AMBIENT TEMPERATURE SHOULD BE IN ACCORDANCE WITH THE FOLLOWING FOR CORRECT EQUIPMENT OPERATION AND PATIENT/OPERATOR COMFORT.

EQUIPMENT ROOM TEMPERATURE: 68.0° – 75.2° F, HUMIDITY: 40–70%  
SCAN ROOM TEMPERATURE: 60.8° – 75.2° F, HUMIDITY: 40–60%  
CONTROL ROOM TEMPERATURE: 60.8° – 86.0° F, HUMIDITY: 40–75%

NOTE:  
A MINIMUM OF 10 AIR CHANGES PER HOUR IS SUGGESTED CONSULT LOCAL CODE.

AIR SUPPLY DUCTS SHOULD NOT BE PLACED DIRECTLY OVER EXAMINATION TABLES FOR PATIENT COMFORT.

EQUIPMENT IN ENCLOSED SPACES SUCH AS EQUIPMENT ROOMS, TRANSFORMER CLOSETS AND COMPUTER ROOMS MUST BE PROVIDED WITH ADEQUATE VENTILATION. THE AIR FLOW THROUGH TOSHIBA EQUIPMENT CABINETS IS FROM BOTTOM TO TOP. WHERE POSSIBLE A/C SUPPLY OUTLETS SHOULD BE LOCATED AT FLOOR LEVEL WITH RETURN GRILLES IN THE CEILING.

DEDICATED AIR CONDITIONER REQUIRED FOR SCAN & EQUIPMENT ROOM.

REvised: 12-08-05

### CEILING HEIGHT

RECOMMENDED CEILING HEIGHT: 9'-6 1/4"  
MINIMUM CEILING HEIGHT: 9'-2 1/8"

REvised: 12-08-05

### VIBRATION SPECIFICATION

0.02 m/s<sup>2</sup> (Peak to Peak) = 2.0 Gal  
VIBRATION TESTING IF REQUIRED IS RESPONSIBILITY OF CUSTOMER/CONTRACTOR.

REvised: 12-08-05

NOTE: ALL MATERIAL IN SCAN ROOM MUST BE NON FERROUS.

REvised: 01-09-06

DATE: 01-07-08

SCALE: 1/4" = 1'-0"

DRAWN: G.S.P.

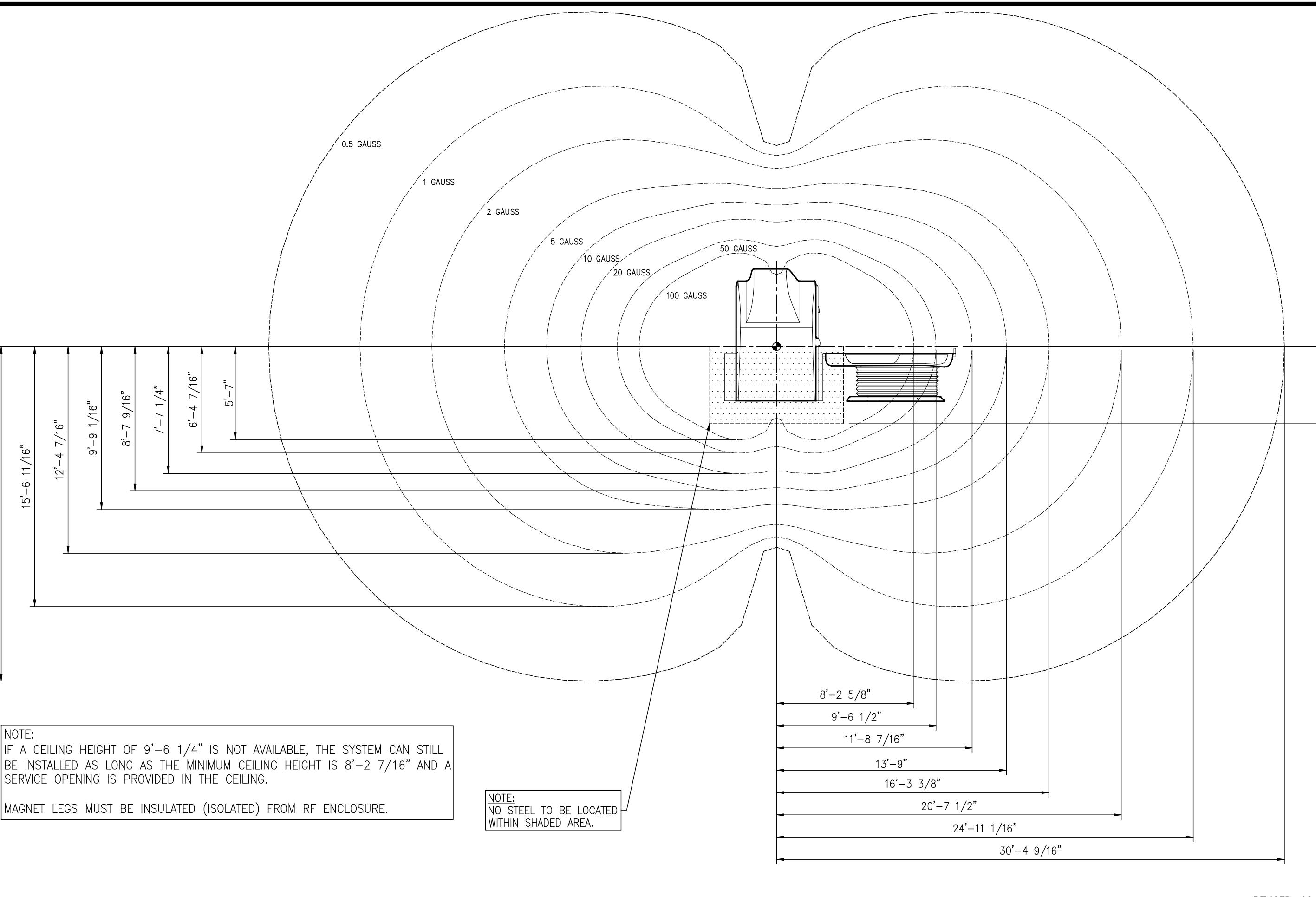
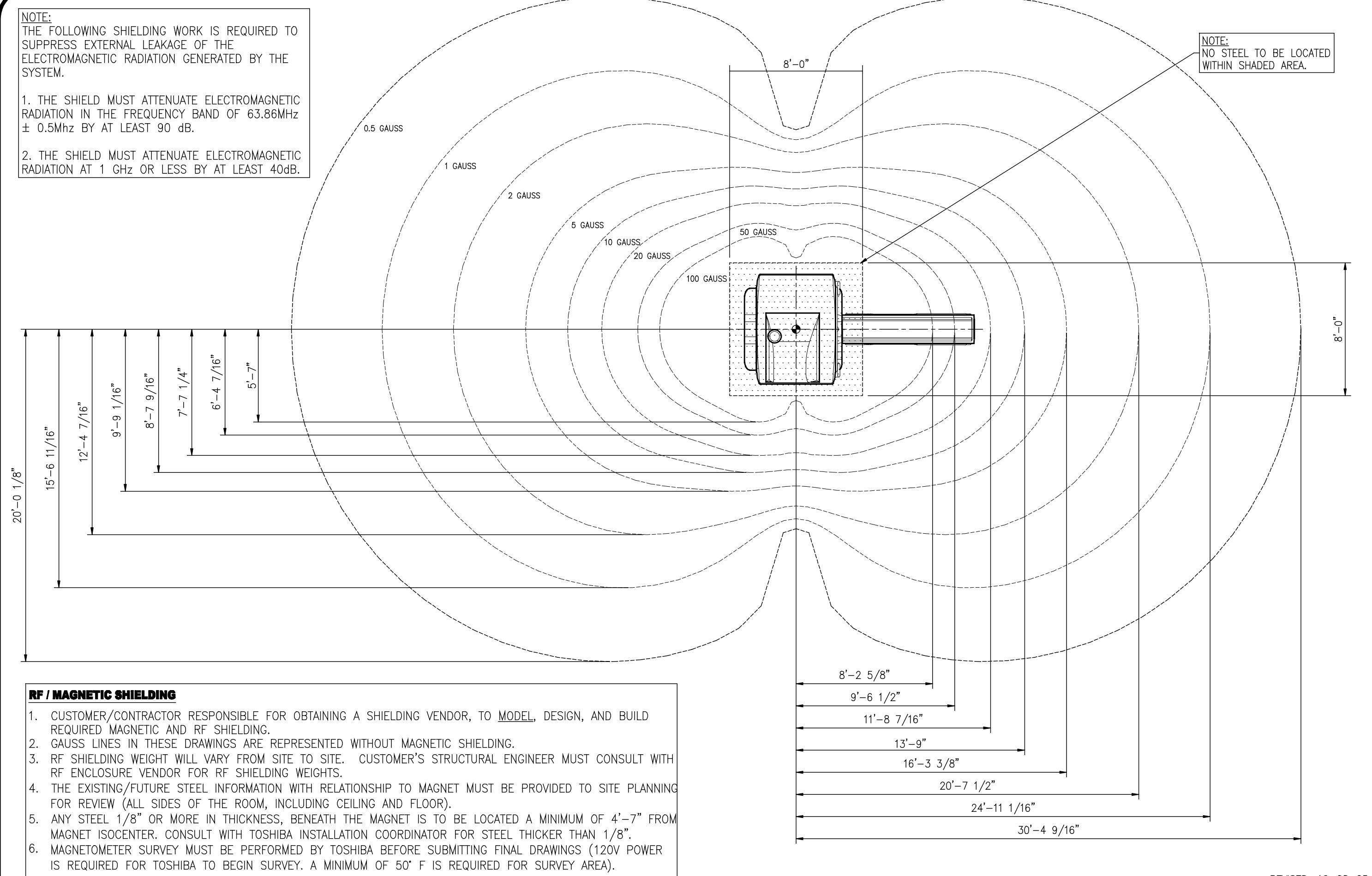
QUOTE: N/A

PROJECT NO.

**TYPICALS**

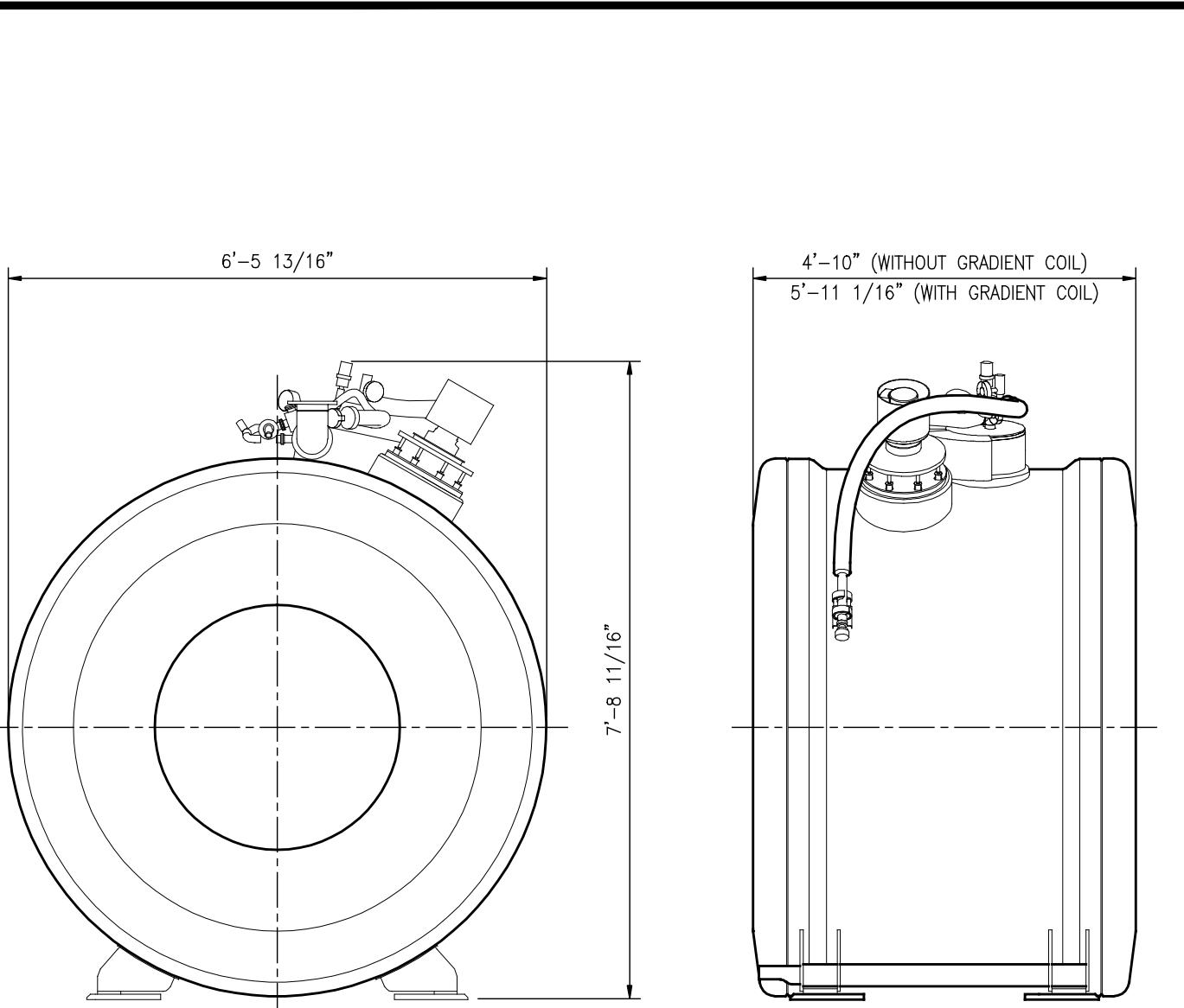
**A1**



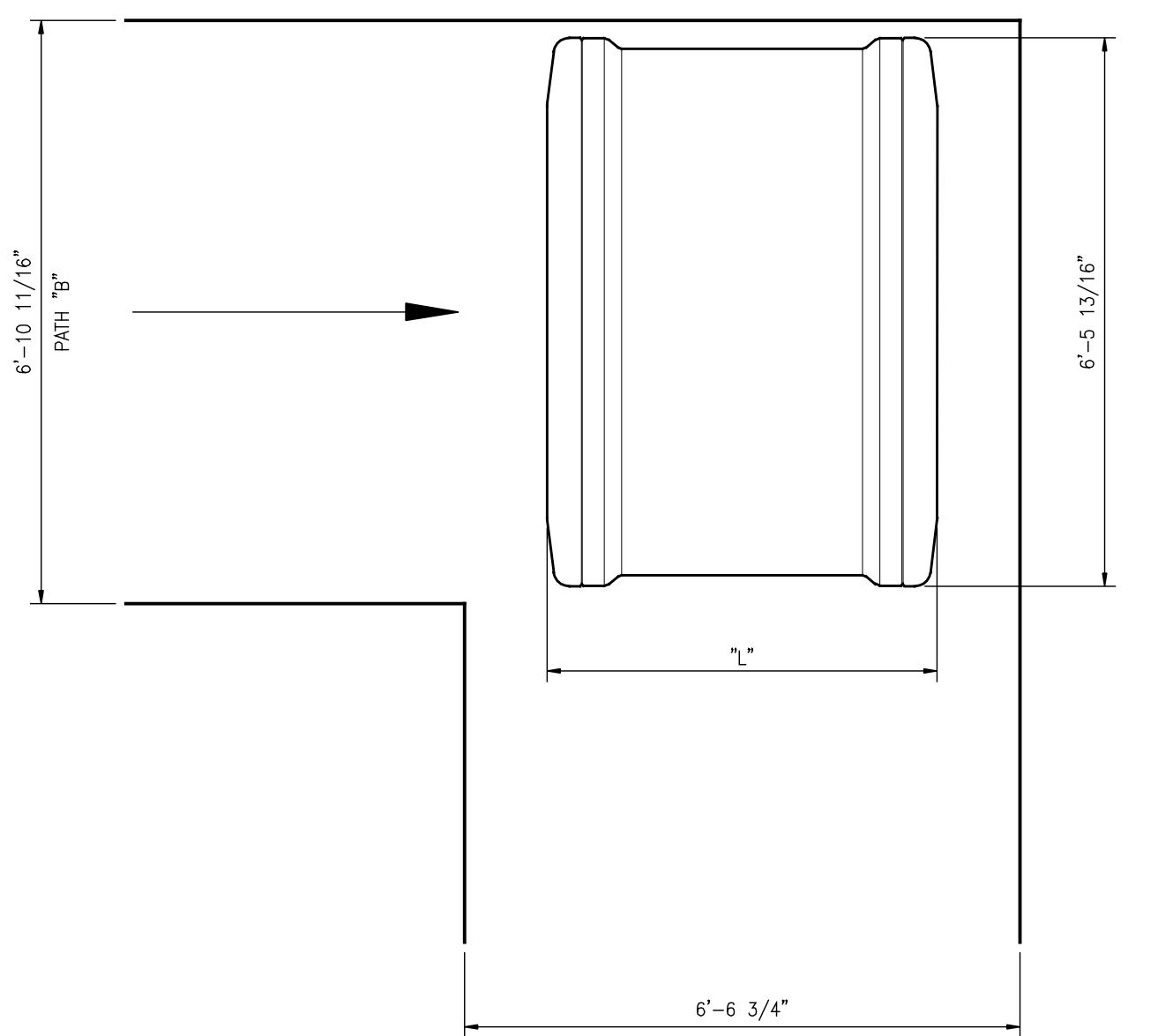


## 1 FRINGE FIELD MEASUREMENTS (PLAN VIEW)

SCALE: 3/8" = 1'-0"



**NOTE:**  
FOR DELIVERY: CONSULT RIGGING CONTRACTOR FOR HEIGHT REQUIREMENTS FOR MATERIALS USED TO TRANSPORT MAGNET TO FINAL LOCATION.  
  
\* CASTER HEIGHTS WILL VARY.  
\* CARRYING IN WEIGHT WITHOUT GRADIENT COIL, COVER IS 8800 POUNDS (FILLED).



"L" = 5'-10 5/8", PATH = 6'-10 11/16" (ASSEMBLED GANTRY)  
"L" = 4'-9 3/4", PATH = 6'-6 3/4" (MAGNET ONLY)

**NOTE:**  
IF ORIENTATION IS NOT CHANGED AT THE CORNER, 6'-6 3/4" WIDTH IS SUFFICIENT FOR PATH "A" AND 6'-10 11/16" FOR PATH "B".

## 3 MAGNET ASSEMBLY FOR CARRYING IN

SCALE: 1/2" = 1'-0"

REVISED: 05-01-06

## 4 MINIMUM CORRIDOR WIDTH FOR EQUIPMENT INGRESS

SCALE: 1/2" = 1'-0"

UNIT	EXAMPLES	mTesla (Gauss)	ft
ACCELERATING TUBE	LINEAR ACCELERATORS	0.05 (0.5)	27.9
I.I.	CT (DETECTOR, DATA ACQUISITION), X-RAYS SYS.	0.05 (0.5)	27.9
NON-SHIELDED PHOTO-MULTIPLIER TUBE	CT, GAMMA CAMERA, PET SYSTEMS	0.05 (0.5)	27.9
REED RELAY	PACEMAKERS	0.5 (5)	15.8
X-RAY TUBE	CT, X-RAY SYSTEMS	1 (10)	13.1
CRT	MONOCHROME MONITORS (SHIELDED)	0.5 (5)	15.8
	MONOCHROME MONITORS (UNSHIELDED)	0.2 (2)	19.7
	COLOR MONITORS (SHIELDED)	.1 (1)	23.0
	COLOR MONITORS (UNSHIELDED)	0.05 (0.5)	27.9
	MULTIFORMAT CAMERAS	1 (10)	13.1
	ULTRASONIC DIAGNOSTIC SYSTEMS	0.2 (2)	19.7
	ELECTROCARDIOGRAPHYS	0.2 (2)	19.7
OXYGEN MONITOR	INCLUDED IN THE MRI SYSTEM CONFIGURATION	2 (20)	11.5
EMERGENCY MAGNET RUN DOWN UNIT	INCLUDED IN THE MRI SYSTEM CONFIGURATION	2 (20)	11.5
WALL CABINET	UNITS MAKING UP THE EMRI SYSTEM	10 (100)	8.5
FILTER BOX	UNITS MAKING UP THE EMRI SYSTEM	10 (100)	8.5
RF CABINET	UNITS MAKING UP THE EMRI SYSTEM	0.5 (5)	15.8
GRADIENT POWER SUPPLY	UNITS MAKING UP THE EMRI SYSTEM	0.5 (5)	15.8
TRANSFORMER CABINET	UNITS MAKING UP THE EMRI SYSTEM	0.5 (5)	15.8
CONTROLLER	UNITS MAKING UP THE EMRI SYSTEM	0.5 (5)	15.8
VACUUM PUMP UNIT	UNITS MAKING UP THE EMRI SYSTEM	0.5 (5)	15.8
MAGNETIC RECORDING MEDIA	MAGNETIC TAPES, FLOPPY DISKS	1 (10)	13.1
MAGNETIC RECORDING MEDIA	BANK, CREDIT CARDS	2 (20)	11.5
OTHERS	WATCHES	3 (30)	10.5
	ELECTRON MICROSCOPES	0.0001	-.-

**NOTE:**  
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DATE: 01-07-08

SCALE: AS NOTED

DRAWN: G.S.P.

QUOTE: N/A

PROJECT NO.

**TYPICALS**

**A2**

5 EFFECTS OF THE MAGNETIC FIELD
SCALE: NOT TO SCALE

### TYPICAL DRAWING

(MRI SCAN ROOM – VANTAGE/TITAN)

INT.	



REV.	DATE	DESCRIPTION

A3

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DATE: 01-07-08

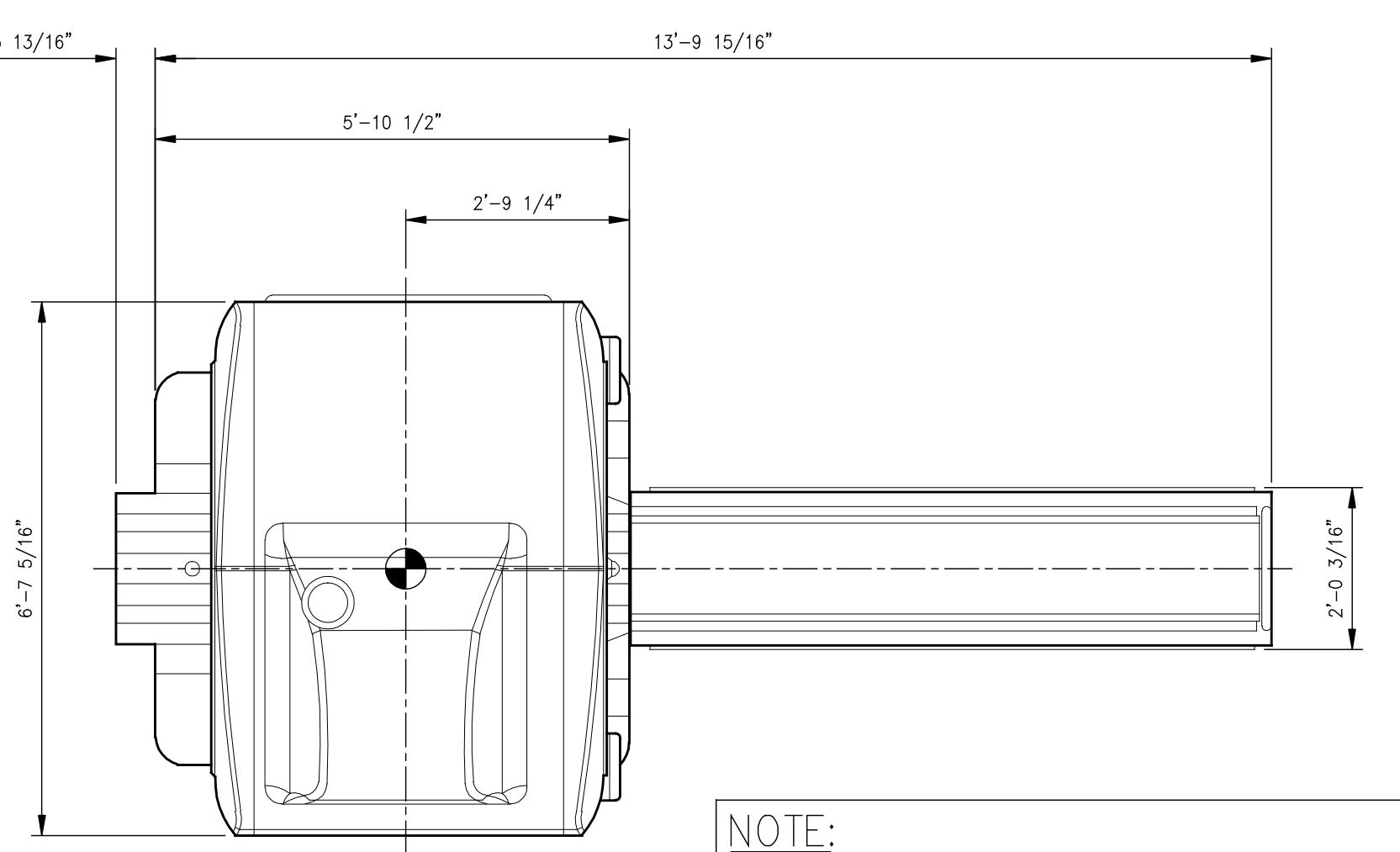
SCALE: AS NOTED

DRAWN: G.S.P.

QUOTE: N/A

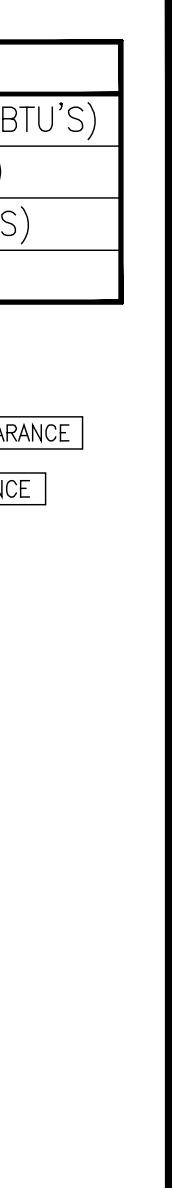
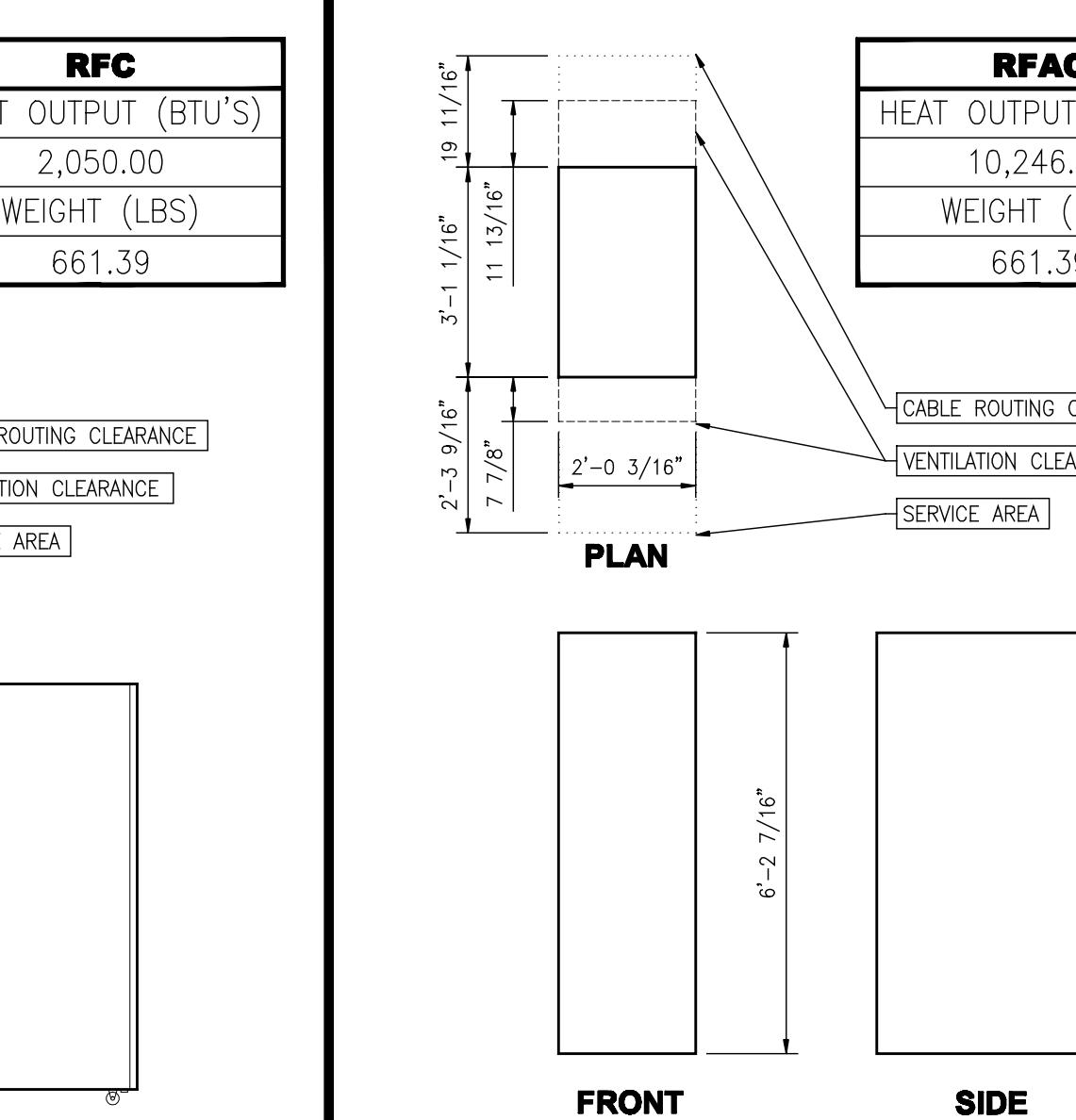
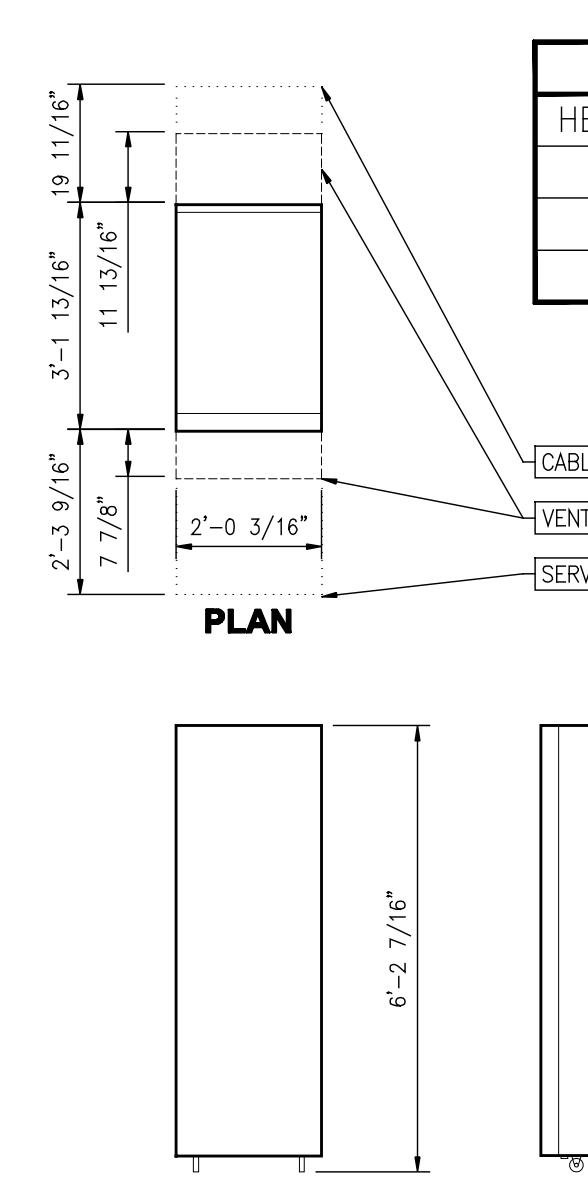
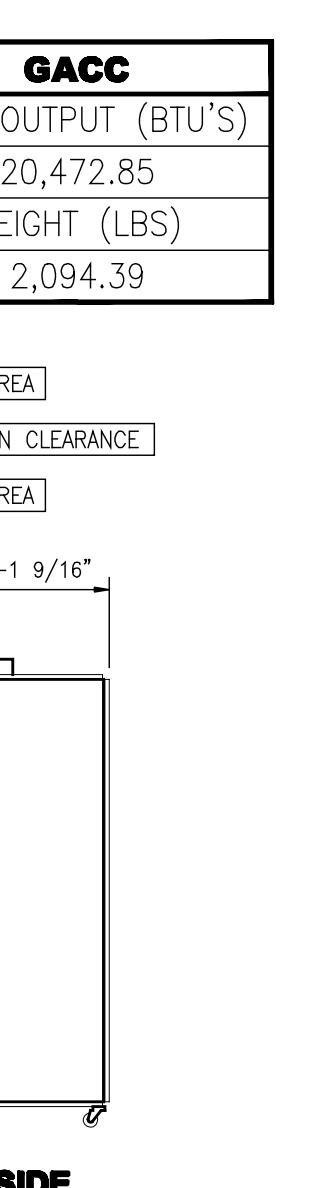
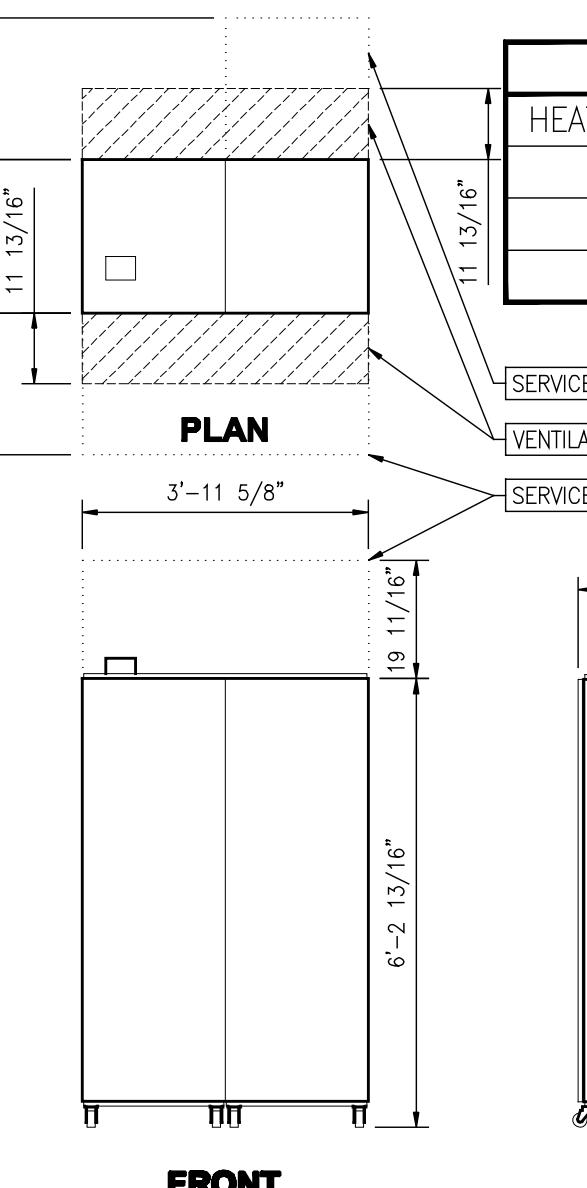
PROJECT NO.

TYPICALS

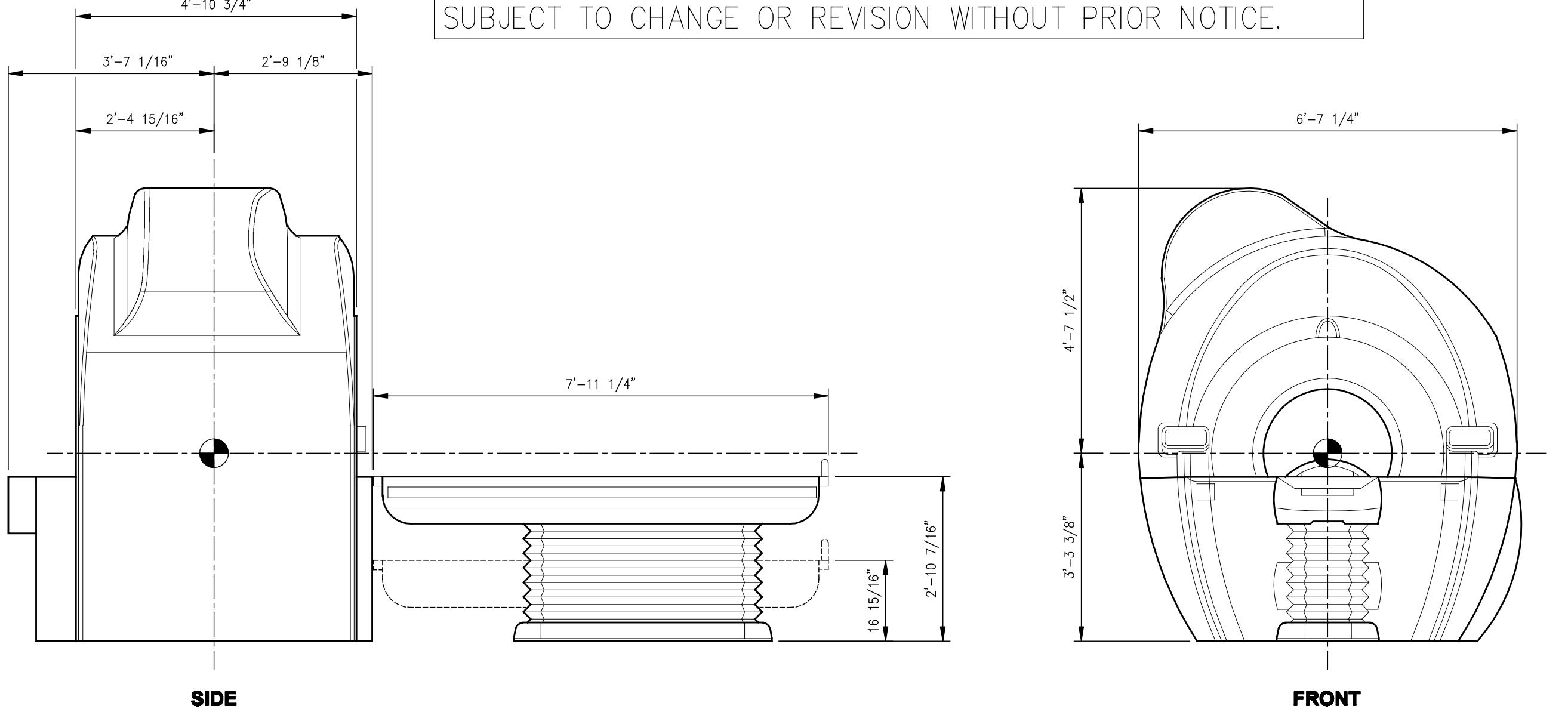


<b>MAG</b>	HEAT OUTPUT (BTU'S) 4,094.57 WEIGHT (LBS) 11,904.96
<b>PCH</b>	HEAT OUTPUT (BTU'S) N/A WEIGHT (LBS) 617.29

<b>GACC</b>	HEAT OUTPUT (BTU'S) 20,472.85 WEIGHT (LBS) 2,094.39
<b>RFC</b>	HEAT OUTPUT (BTU'S) 2,050.00 WEIGHT (LBS) 661.39

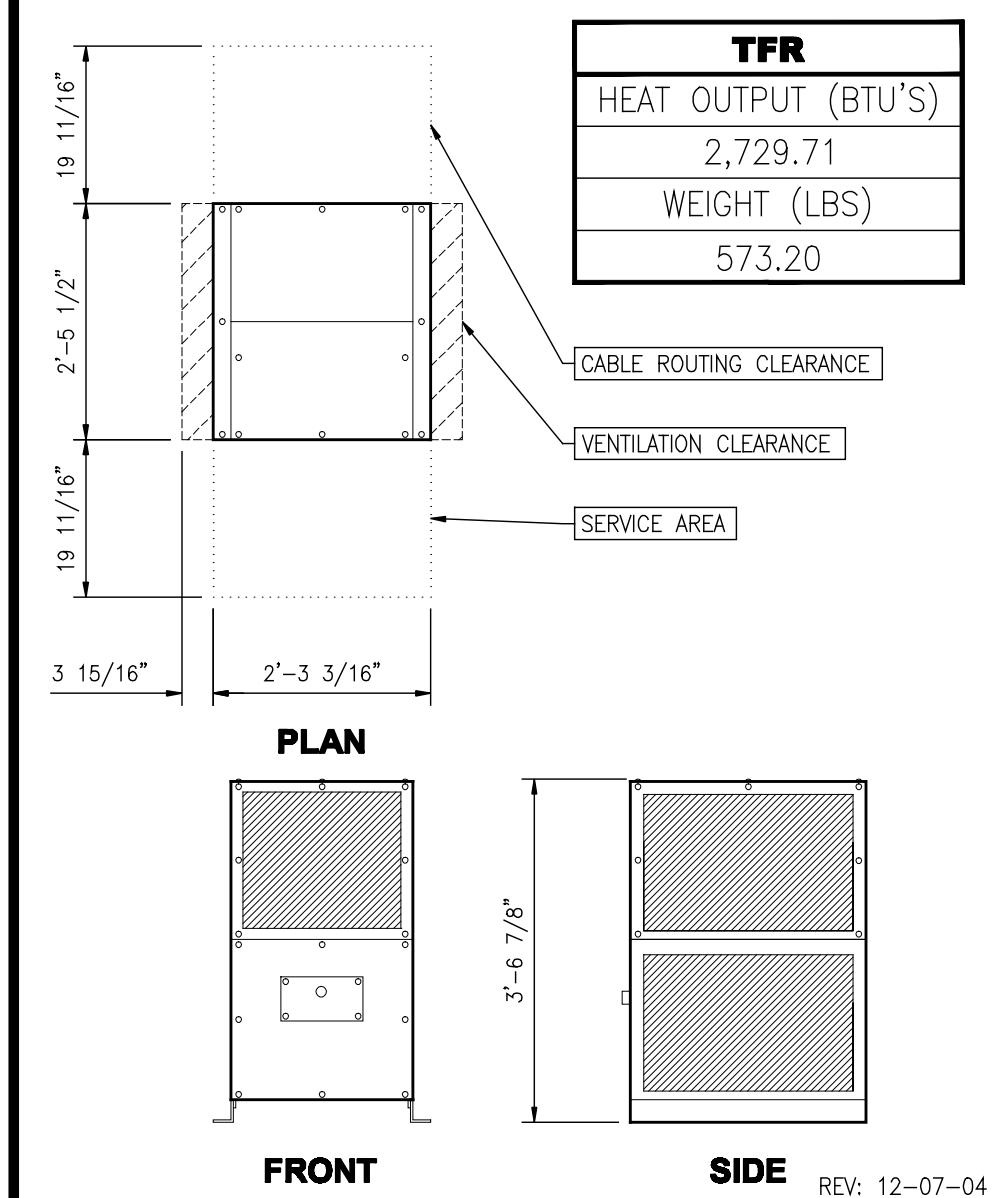


NOTE:  
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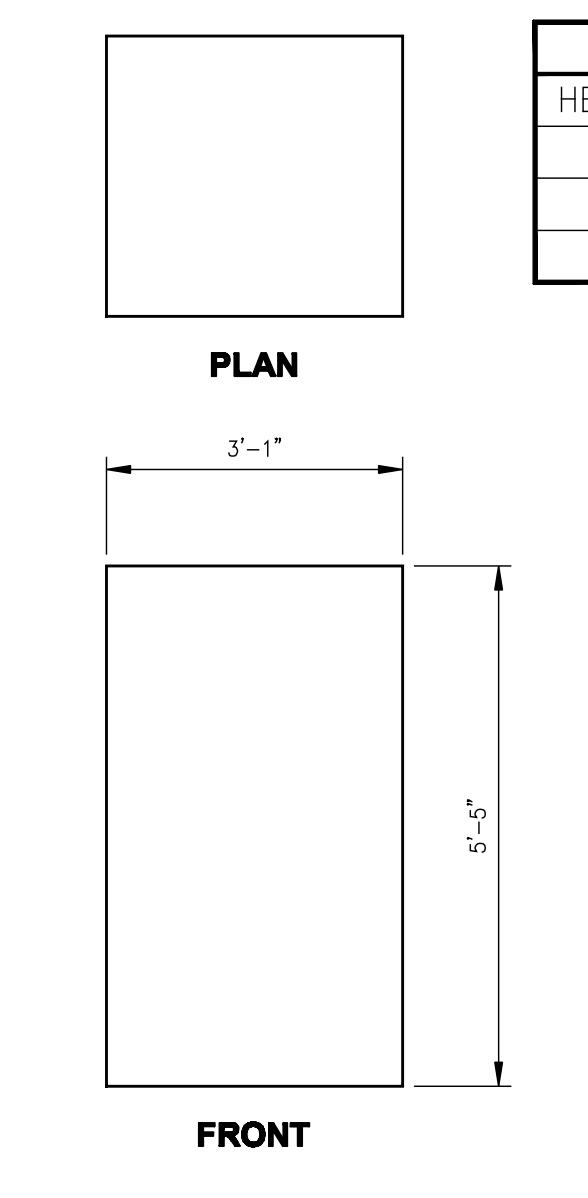
### 2 TITAN GRADIENT & CONTROL CABINET

SCALE: 3/8" = 1'-0"



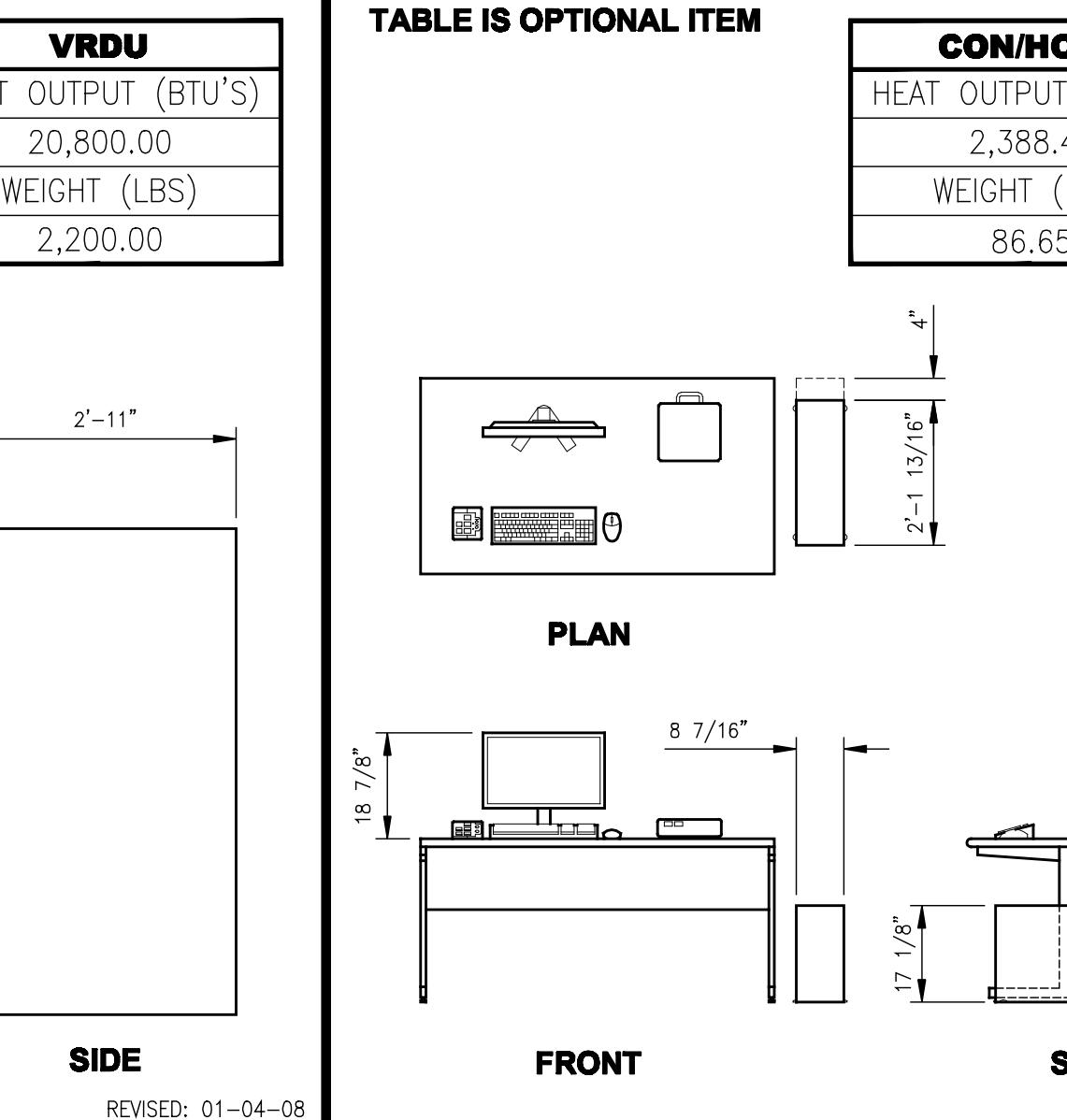
### 3 TITAN RF CABINET

SCALE: 3/8" = 1'-0"



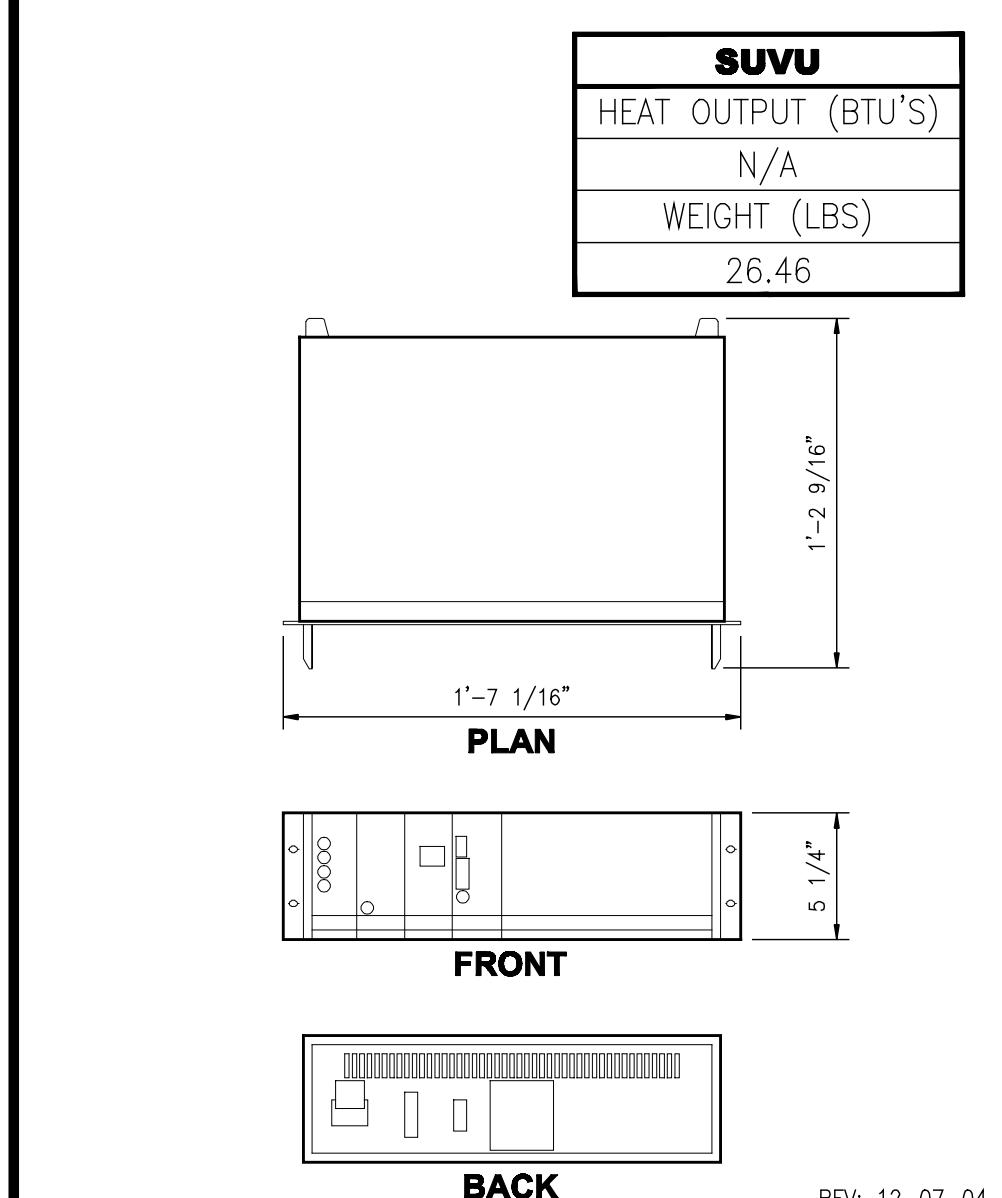
### 4 TITAN RF AMP CABINET

SCALE: 3/8" = 1'-0"



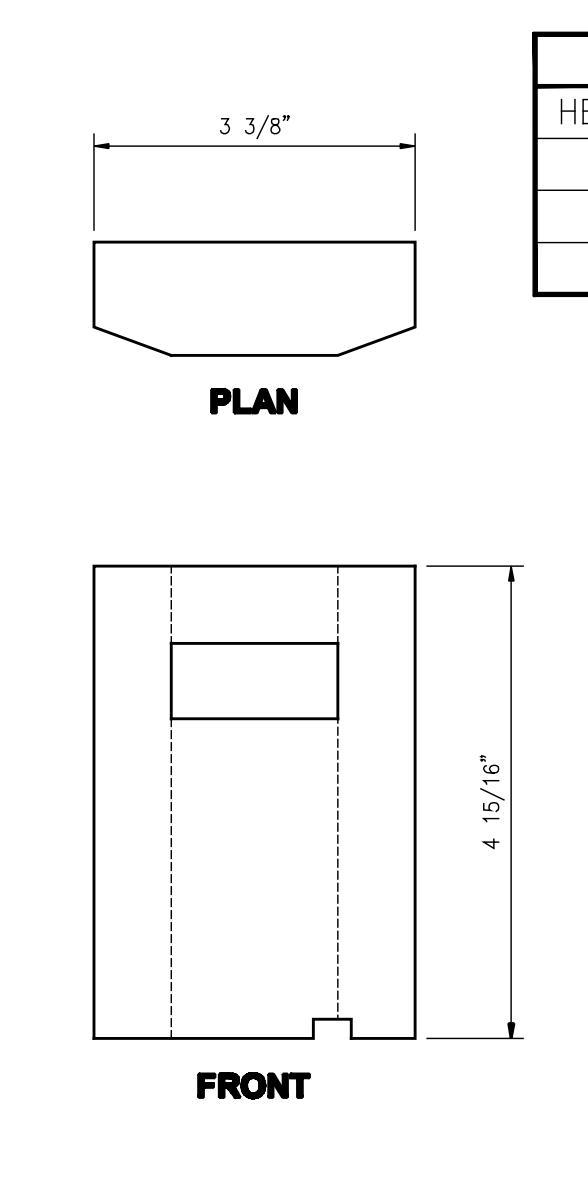
### 5 TRANSFORMER CABINET

SCALE: 1/2" = 1'-0"



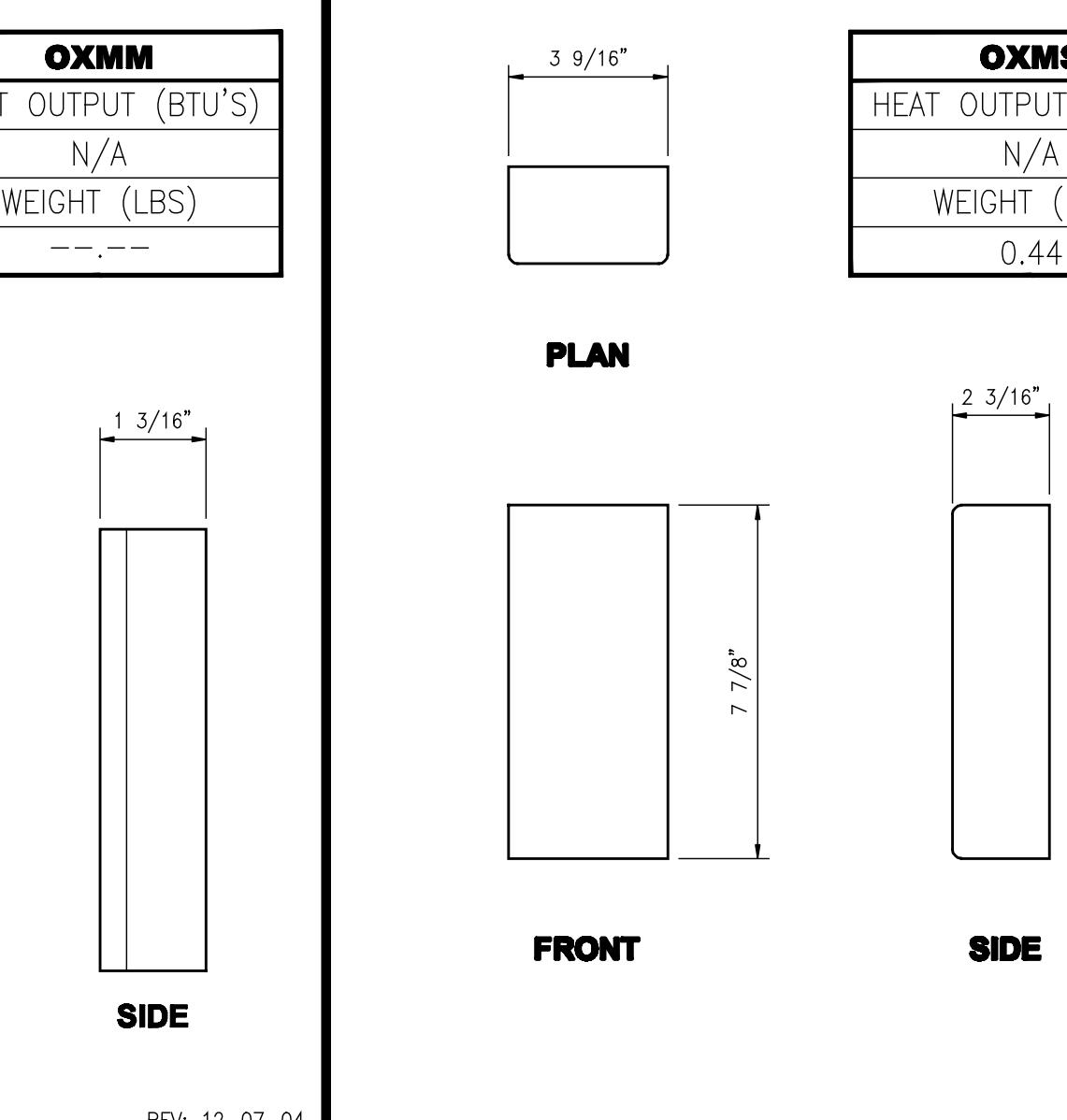
### 6 VOLTAGE REGULATING DISTRIBUTION UNIT

SCALE: 1/2" = 1'-0"



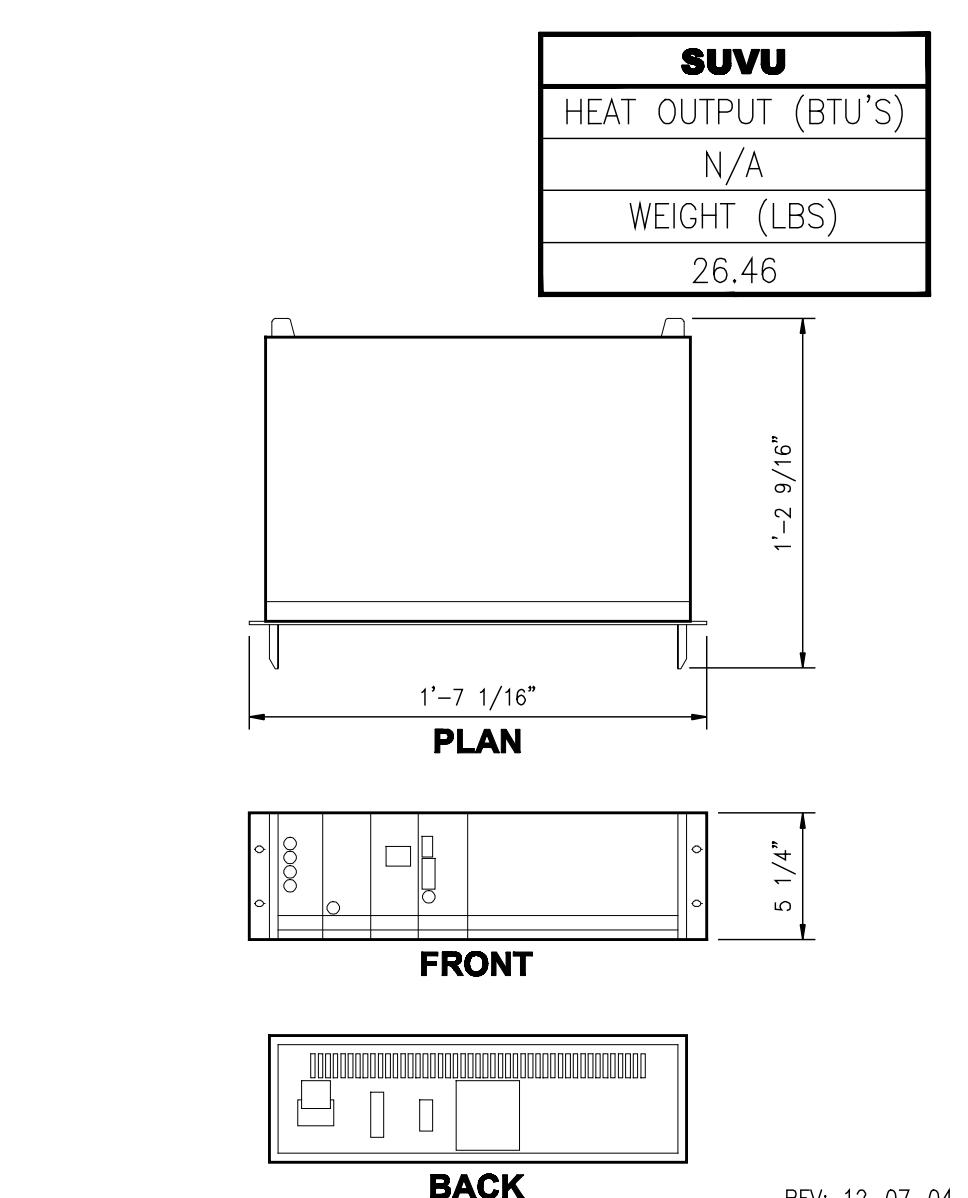
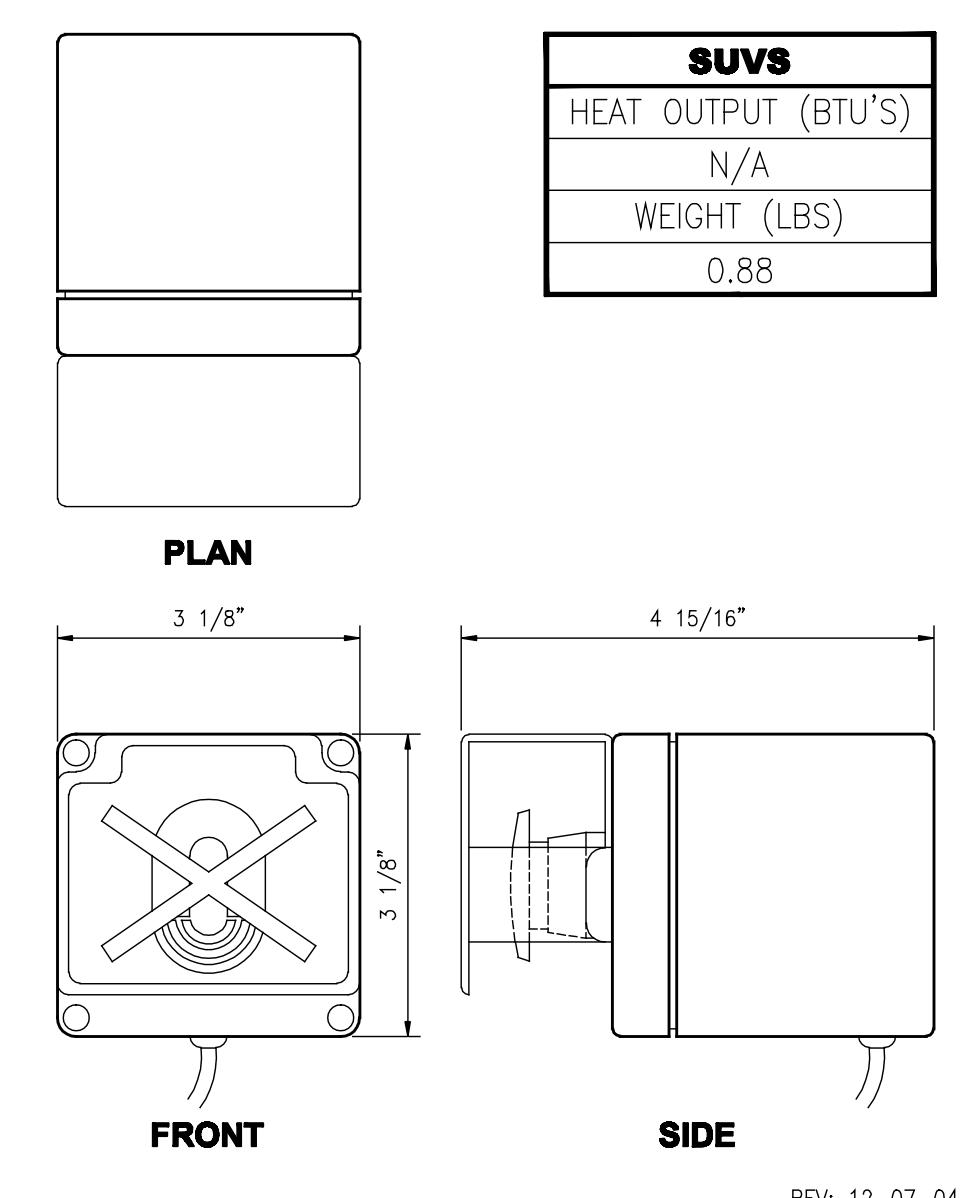
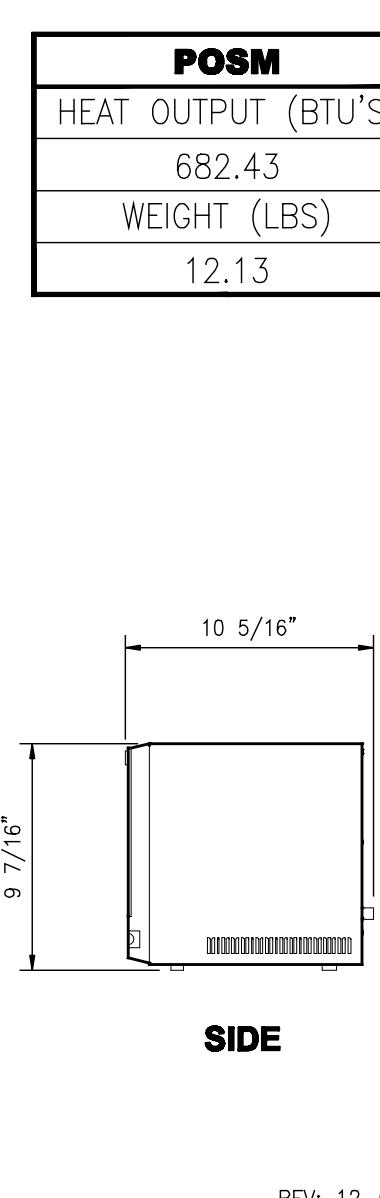
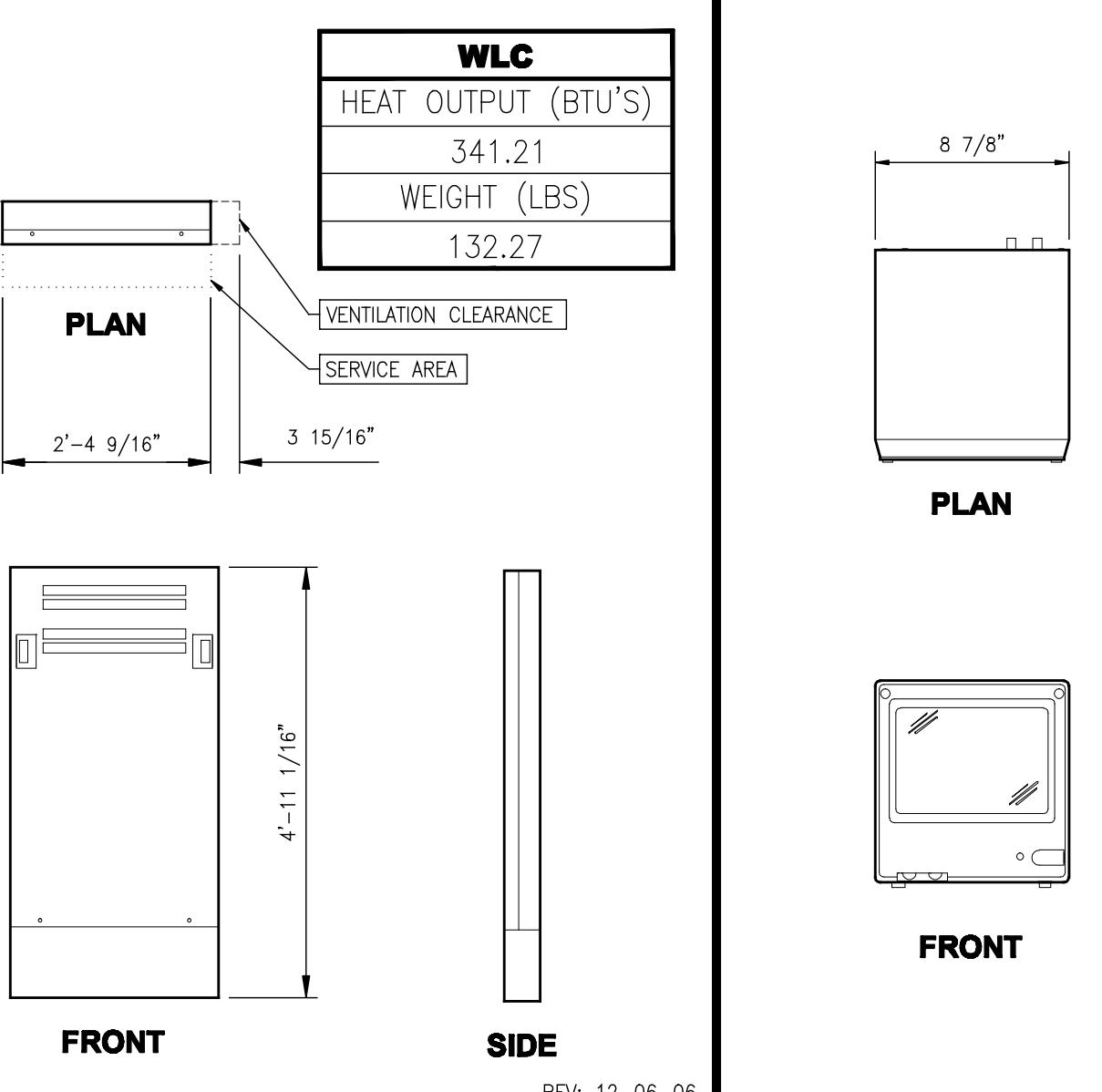
### 7 18" LCD, CONTROL PAD, & CONTROL BOX

SCALE: 3/8" = 1'-0"



### 1 VANTAGE TITAN 1.5 TESLA MAGNET AND COUCH

SCALE: 1/2" = 1'-0"



### 11 SUPERVISORY UNIT

SCALE: 1 1/2" = 1'-0"



### 12 OXYGEN MONITOR DISPLAY MONITOR

SCALE: 6" = 1'-0"



### 8 TITAN WALL CABINET

SCALE: 1/2" = 1'-0"



### 9 PATIENT OBSERVATION SYSTEM MONITOR

SCALE: 1/2" = 1'-0"



### 10 SUPERVISORY UNIT SWITCH

SCALE: 6" = 1'-0"



### 11 SUPERVISORY UNIT

SCALE: 1 1/2" = 1'-0"



### 12 OXYGEN MONITOR DISPLAY MONITOR

SCALE: 6" = 1'-0"



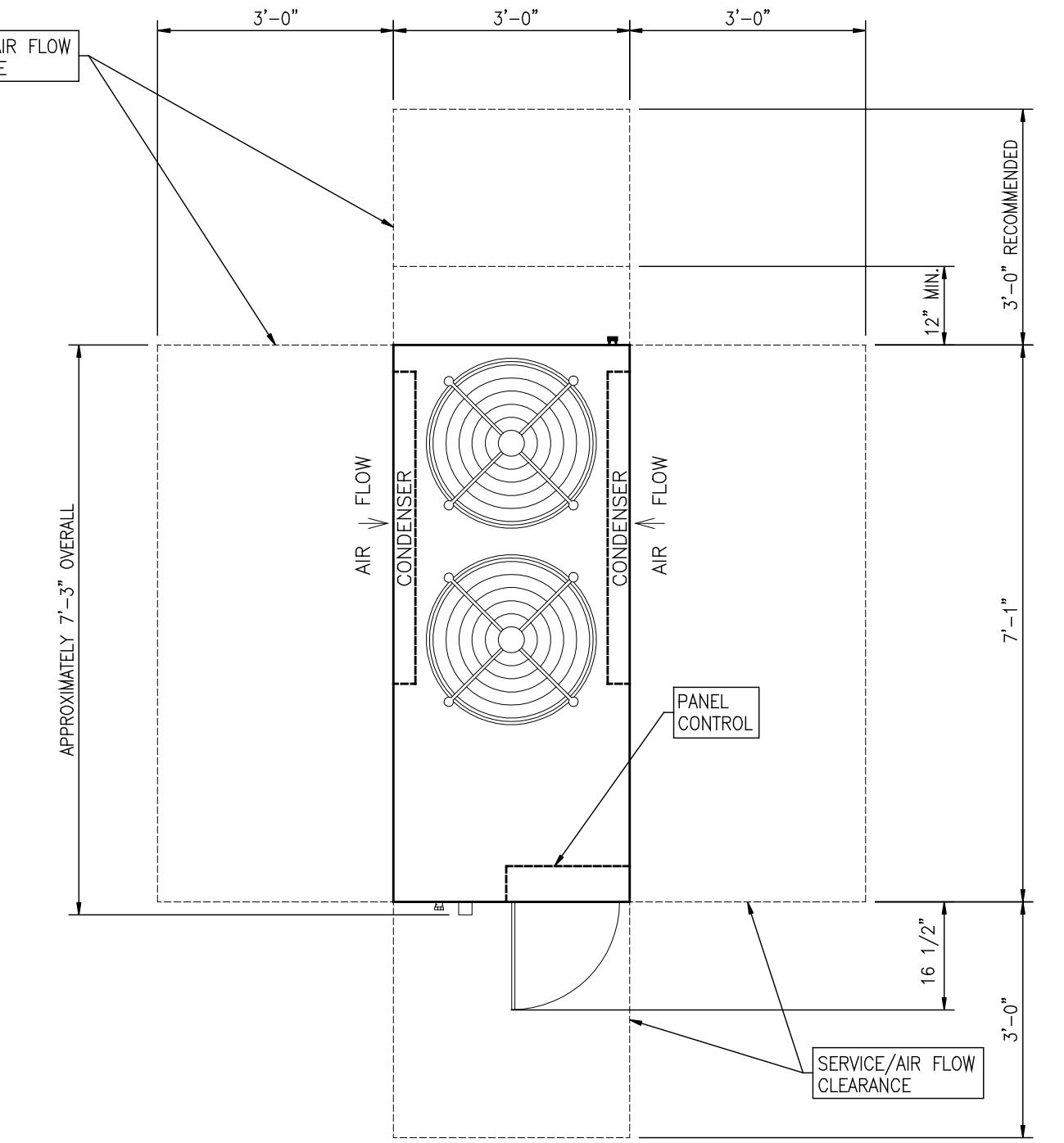
### 13 OXYGEN MONITOR SENSOR

SCALE: 3" = 1'-0"



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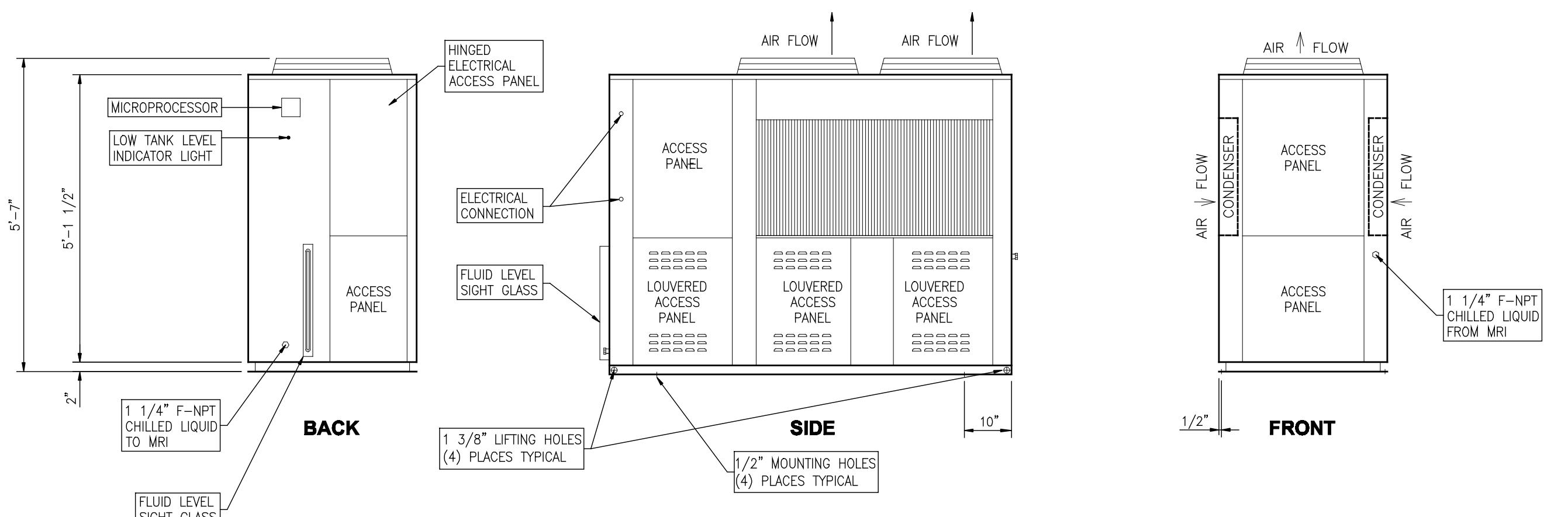
<b>OCU</b>
HEAT OUTPUT (BTU'S)
12,800.00
WEIGHT (LBS)
1,900.00

**NOTE:**  
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**NOTE:**  
IF LOCAL CODE REQUIRES A DISCONNECT AT THE UNIT, IT IS CUSTOMER/CONTRACTOR'S RESPONSIBILITY TO SUPPLY AND INSTALL IT.

**NOTE:**  
3 FEET SERVICE/AIR FLOW CLEARANCE ON ALL SIDES OF THIS UNIT. AIR FLOW MUST NOT BE RESTRICTED ON TOP OF UNIT.

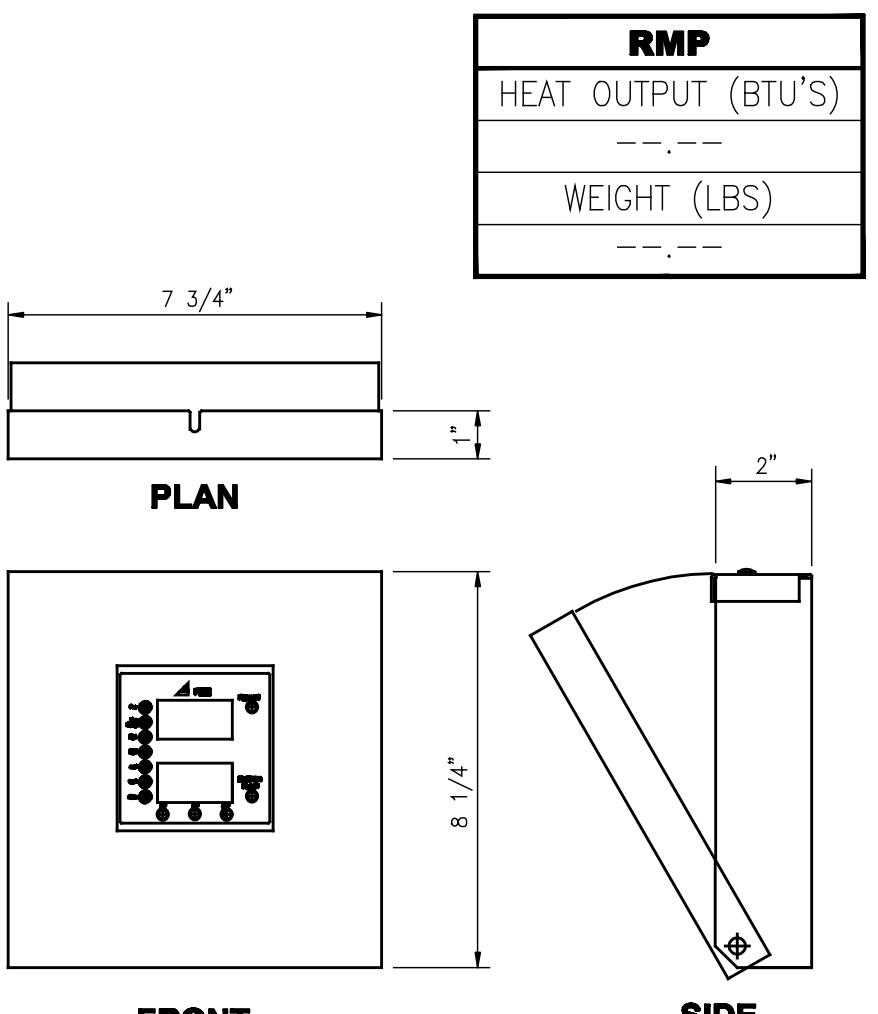
**PLAN**



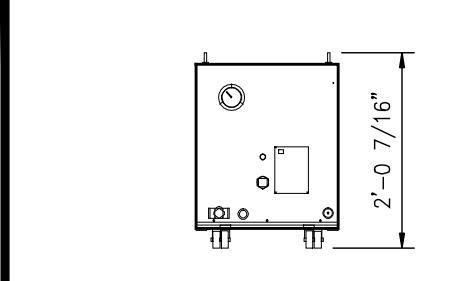
REV: 12-19-07

## 1 DRAKE OUTDOOR CHILLER UNIT (MODEL # T.B.D.)

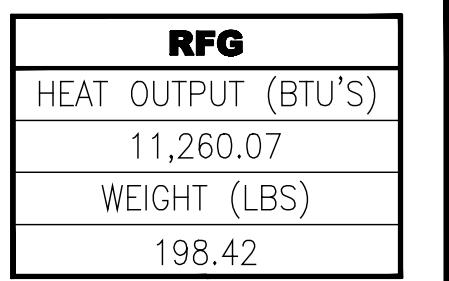
SCALE: 1/2" = 1'-0"



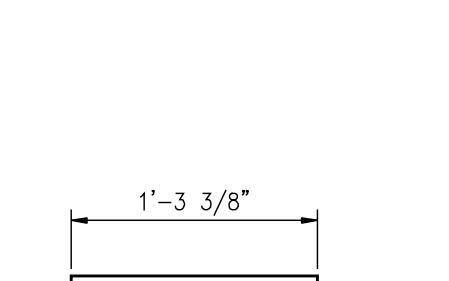
REV: 11-04-05



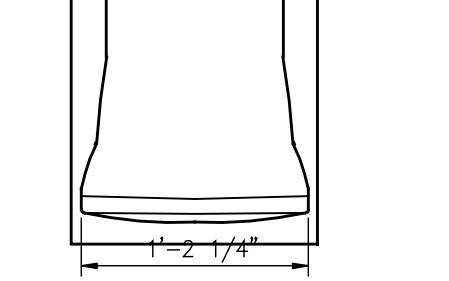
<b>RMP</b>
HEAT OUTPUT (BTU'S)
---
WEIGHT (LBS)
---



<b>RFG</b>
HEAT OUTPUT (BTU'S)
11,260.07
WEIGHT (LBS)
198.42



<b>INV - MONITOR</b>
HEAT OUTPUT (BTU'S)
232.00
WEIGHT (LBS)
27.50



<b>INV - CPU</b>
HEAT OUTPUT (BTU'S)
500.00
WEIGHT (LBS)
22.00

REVISED: 12-20-07

## 3 DRAKE CHILLER REMOTE PANEL

SCALE: 3" = 1'-0"

## 4 REFRIGERATOR CABINET

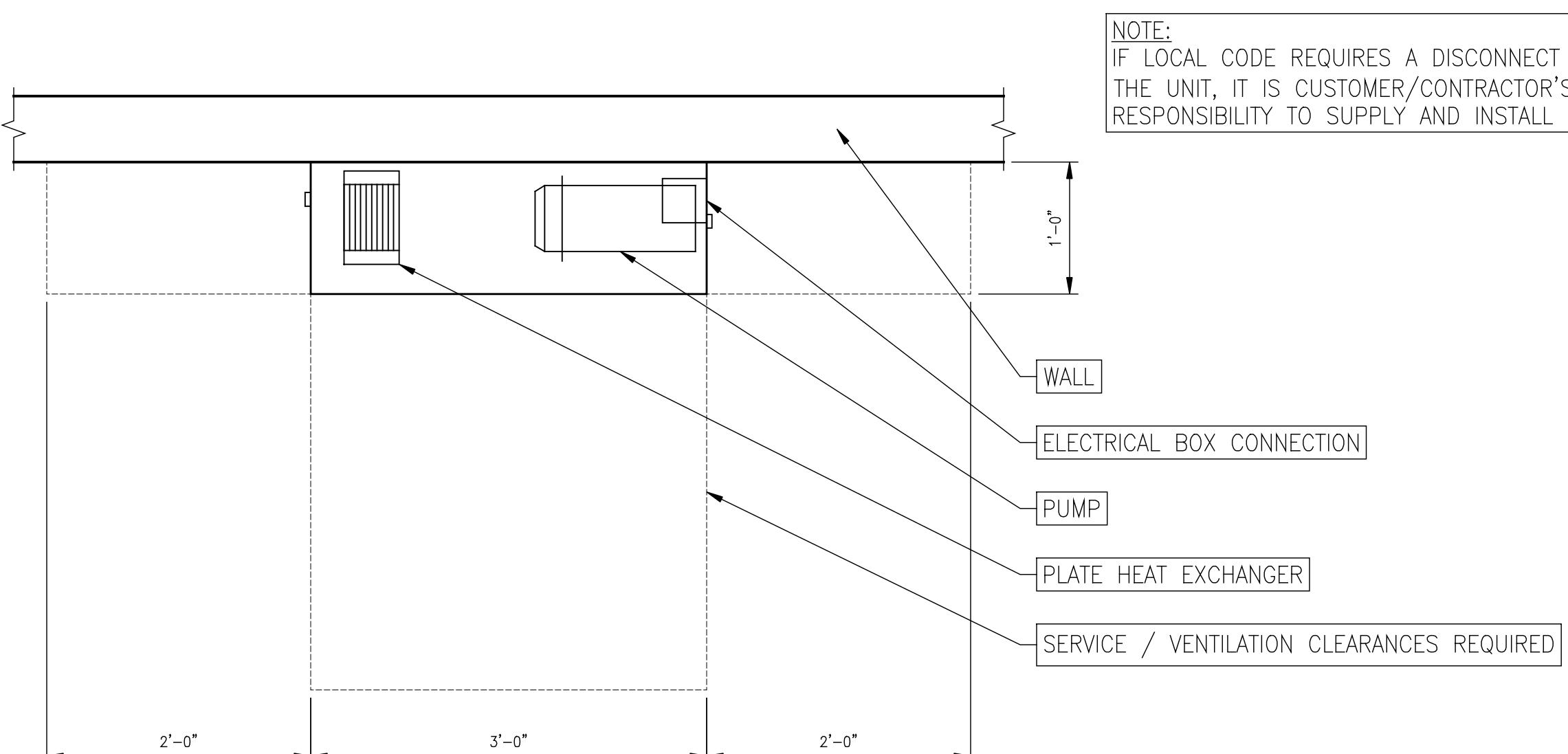
SCALE: 1/2" = 1'-0"

REV: 12-07-04

## 5 INNERVISION WORKSTATION

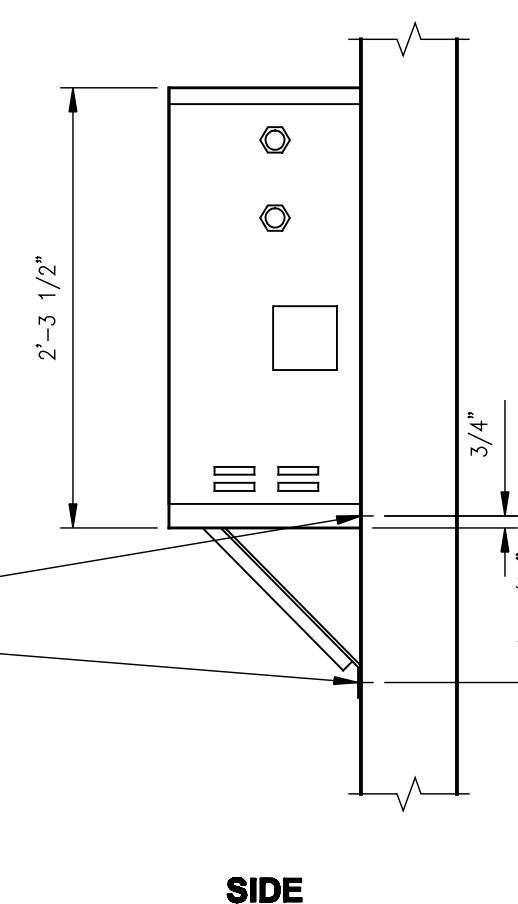
SCALE: 1" = 1'-0"

REV: 12-07-04



**PLAN (WITH TOP REMOVED)**

IDEAL HEIGHT OF THE CHILLER IS APPROXIMATELY 5'-0" A.F.F.



**FRONT**

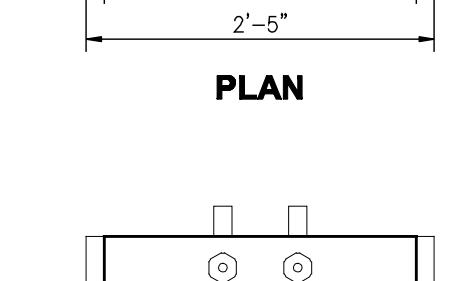
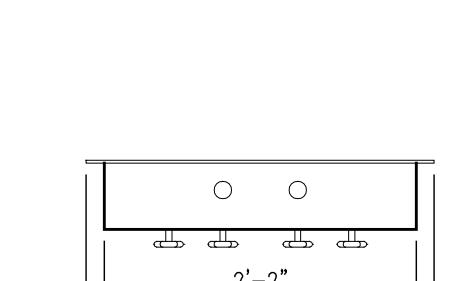
**SIDE**

PKG USED WITH CHILLER MODEL	A	B	C	D
T.B.D.	GLYCOL TO CHILLER	GLYCOL FROM CHILLER	WATER FROM MRI	WATER TO MRI

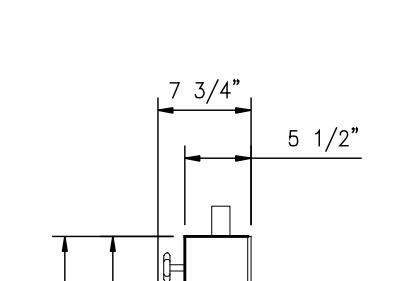
REV: 12-19-07

## 2 DRAKE INDOOR HEAT EXCHANGER (MODEL # T.B.D.)

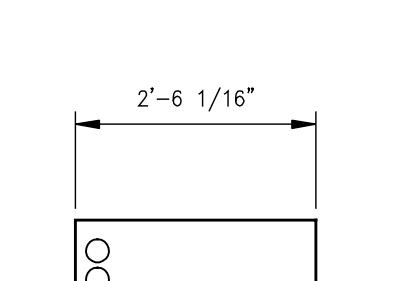
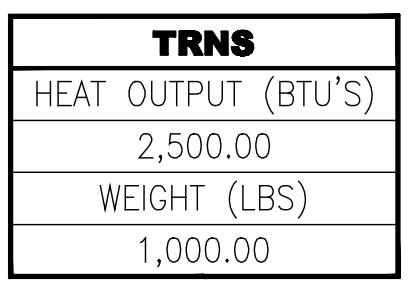
SCALE: 1" = 1'-0"



<b>MANIFOLD</b>
HEAT OUTPUT (BTU'S)
---



<b>LFB1 &amp; LFB2</b>
HEAT OUTPUT (BTU'S)
352.74
WEIGHT (LBS)



REV: 12-07-04

REV: 12-19-07

## 6 MANIFOLD

SCALE: 3/4" = 1'-0"

REV: 12-07-04

## 7 VANTAGE TITAN LINE FILTER PANEL

SCALE: 1/2" = 1'-0"

REV: 12-19-07

## 8 VANTAGE TITAN TRANSFORMER

SCALE: 1/2" = 1'-0"

REV: 01-07-08

## TYPICAL DRAWING

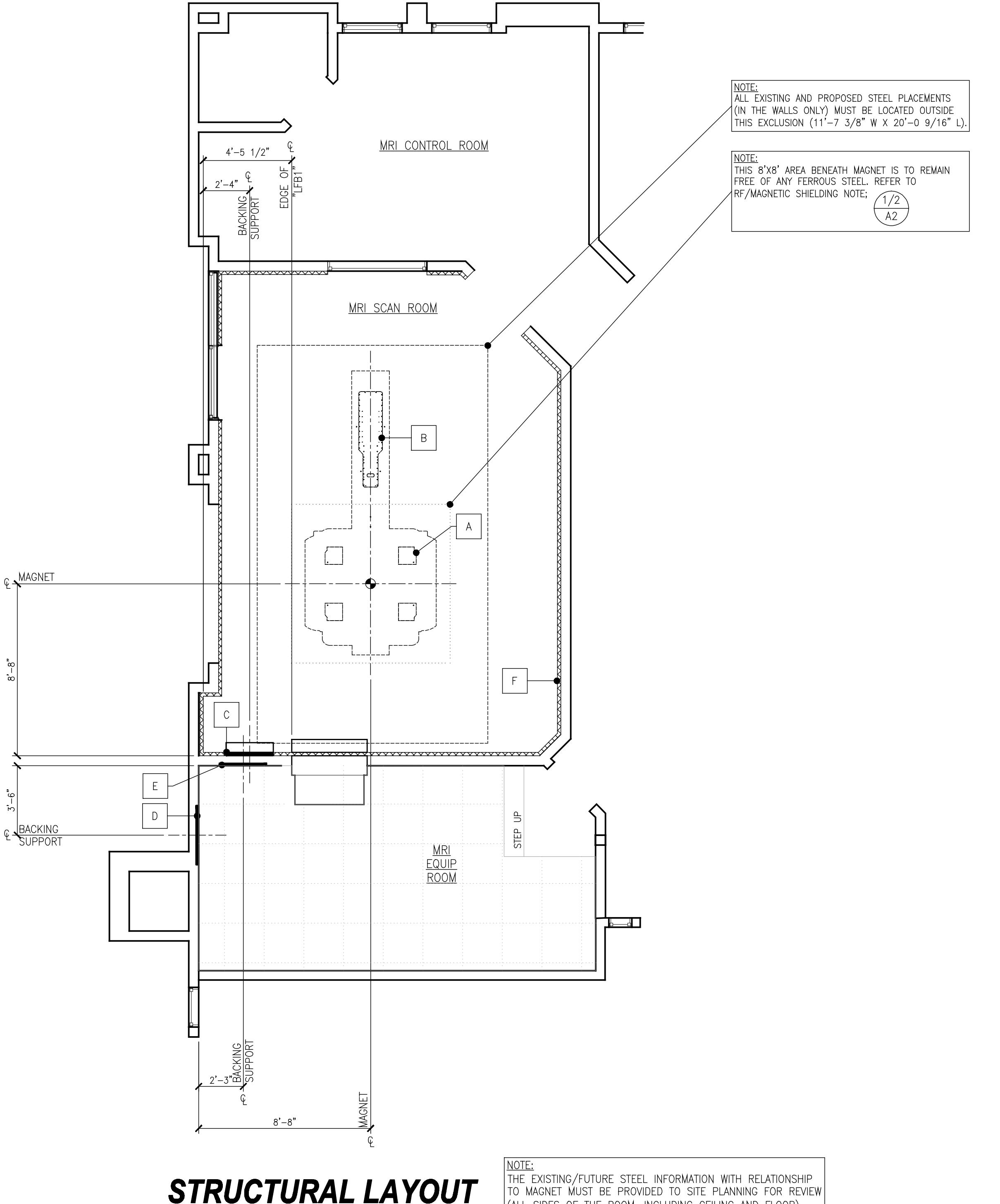
(MRI SCAN ROOM – VANTAGE/TITAN)

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DATE: 01-07-08  
SCALE: AS NOTED  
DRAWN: G.S.P.  
QUOTE: N/A  
PROJECT NO. TYPICALS  
A4

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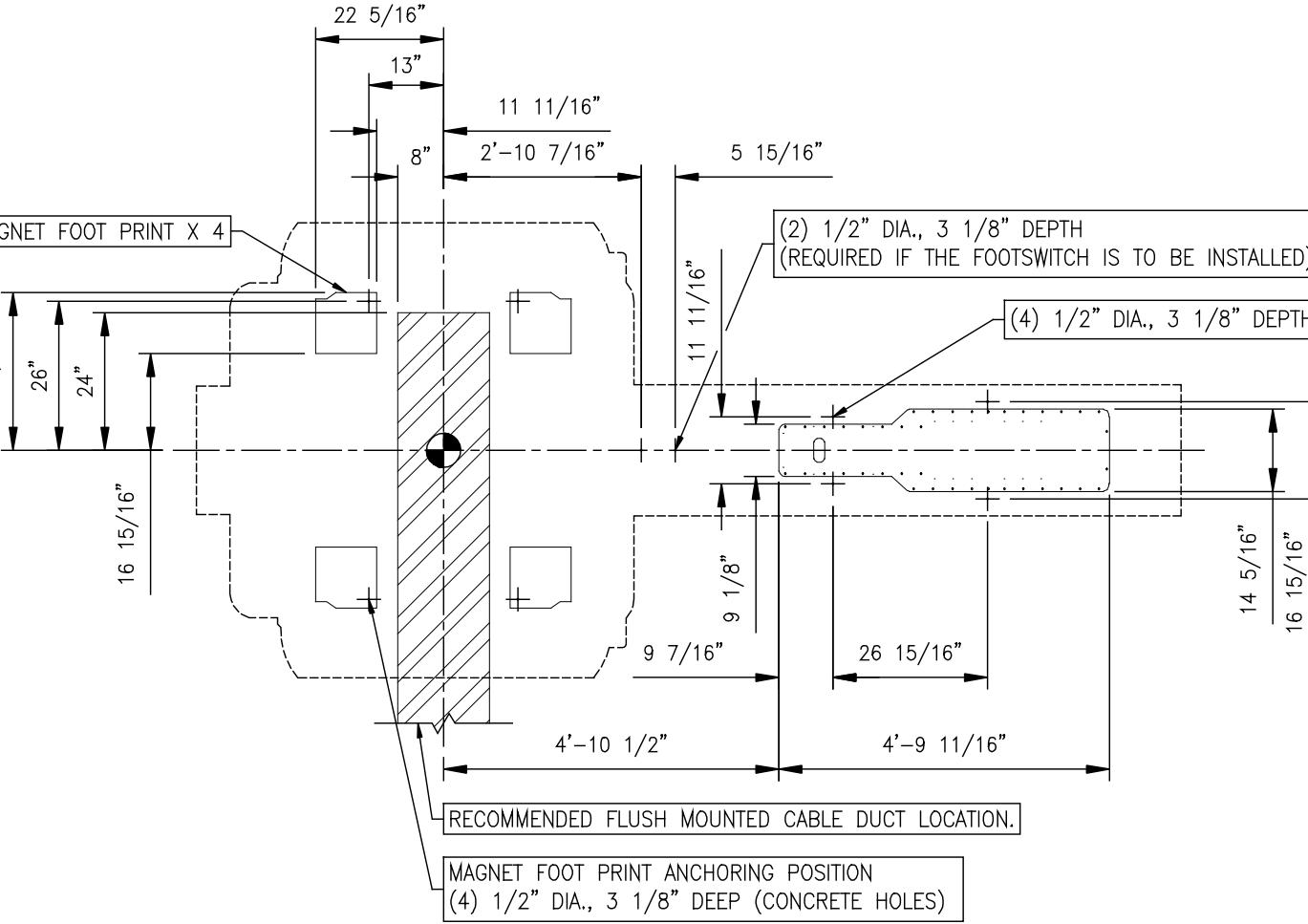


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**STRUCTURAL LEGEND**

ITEM	ITEM DESCRIPTION SUPPLIED / INSTALLED BY TOSHIBA	REF.
A	SUPPORT BASE FOR MAGNET	1 SI
B	MAGNET COUCH BASE	1 SI
C	BACKING SUPPORT FOR WALL CABINET (SEE * NOTE BELOW)	5 M3
D	BACKING SUPPORT (3'-0" W X 4'-6" H) FOR INDOOR HEAT EXCHANGER (HEIGHT T.B.D.)	2 A3
E	BACKING SUPPORT FOR MANIFOLD	---
F	RF ENCLOSURE	---



**NOTE:**

1. IN CASE OF FIRE, THE FINISH MATERIAL OF THE FLOOR MUST BE NONFLAMMABLE AND HIGHLY FIRE RESISTANT, IN ORDER TO PREVENT THE FROM SPREADING.
2. FLOOR IN THIS AREA TO BE LEVEL WITHIN 1/16" OVER ENTIRE AREA.
3. THE FLOOR MUST SUPPORT 11,904.96 lbs. FOR THE MAGNET, INCLUDING THE COVERS AND THE GRADIENT COIL. THE COMPLETE FLOOR MUST WITHSTAND A MAXIMUM CONCENTRATED MAGNET LOAD OF 3,796.04 lbs. PER SQUARE FOOT (2,976.24 lbs. PER MAGNET FOOT). THE FLOOR MUST BE ABLE TO WITHSTAND BOTH THE MAGNET AND THE WEIGHT OF THE MAGNETIC SHIELDING.
4. IT IS RF VENDOR'S RESPONSIBILITY TO PROVIDE BOLTS AND ANCHORING THE MAGNET.
5. IT IS CUSTOMER/CONTRACTOR'S RESPONSIBILITY TO MEET SEISMIC REQUIREMENTS (IF NECESSARY).

REV.	DATE	DESCRIPTION

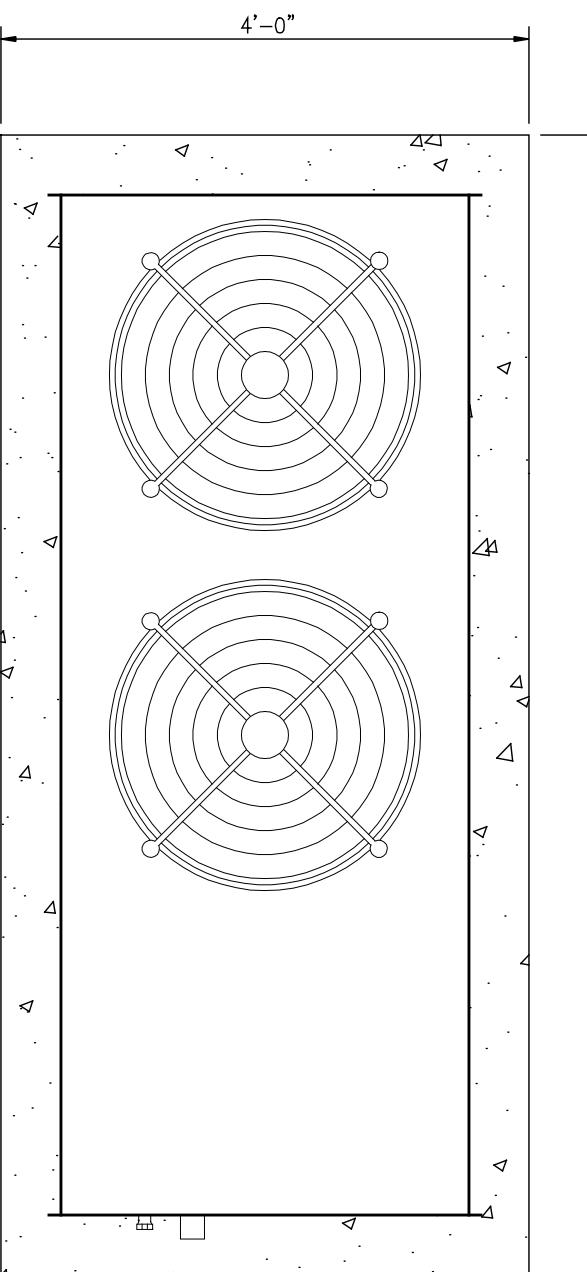
REVISED: 09-24-07

**1 VANTAGE / ATLAS MAGNET FOOTPRINT & COUCH LAYOUT**

SCALE: 3/8" = 1'-0"

**NOTE:**  
ALL MATERIAL IN SCAN ROOM MUST BE NON FERROUS.  
CONTRACTOR TO PROVIDE 5/8" PLYWOOD OR NON FERROUS MATERIAL BACKING PLATE FOR INSTALLING WALL CABINET.

REVISED: 01-09-06



**SIZE OF CONCRETE PAD**

REVISED: 05-01-06

2 DRAKE OUTDOOR CHILLER UNIT
SCALE: 3/4" = 1'-0"

**S1**

**TYPICAL DRAWING**

(MRI) SCAN ROOM – VANTAGE/TITAN)

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DATE: 01-07-08

SCALE: 1/4" = 1'-0"

DRAWN: G.S.P.

QUOTE: N/A

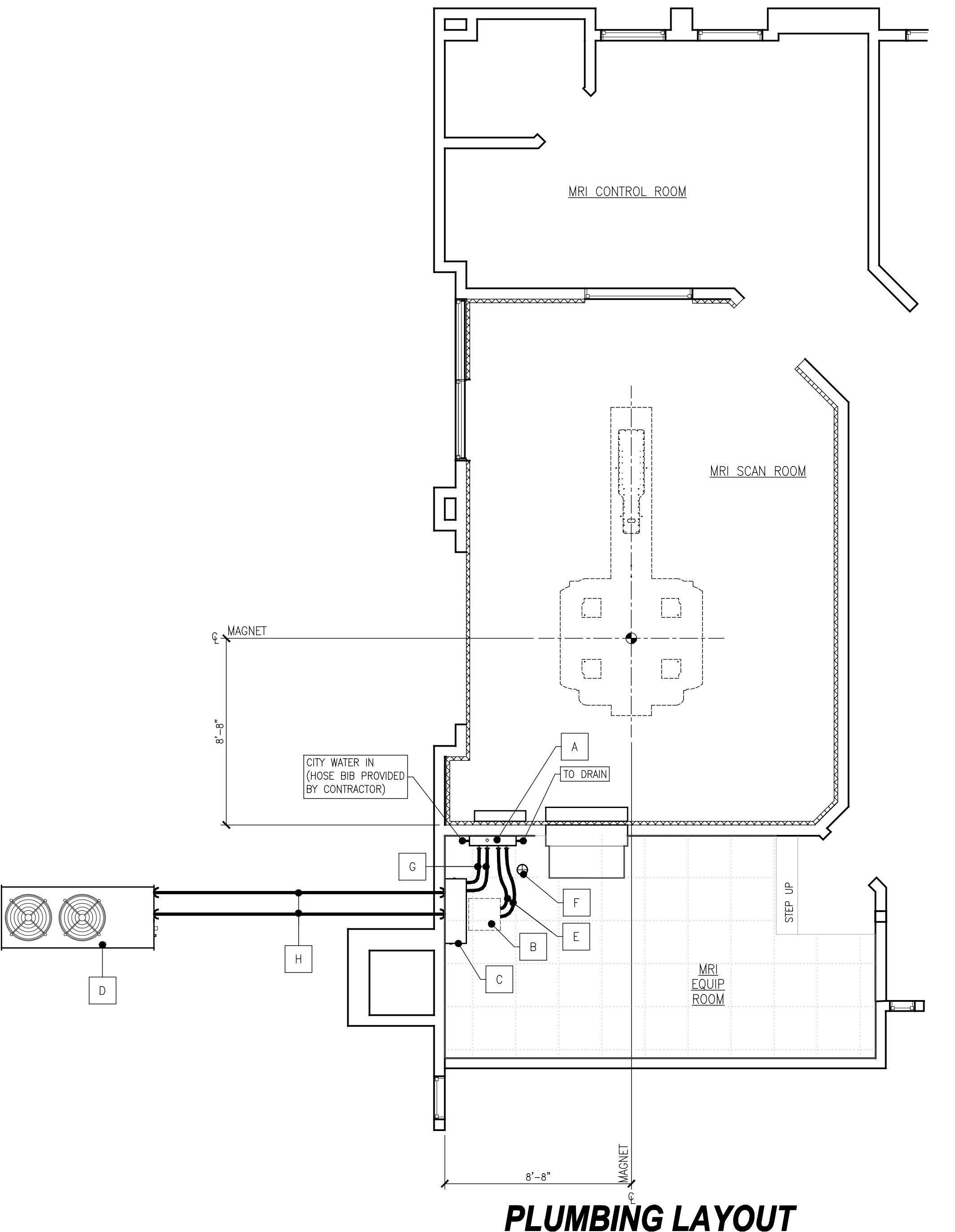
PROJECT NO.

**TYPICALS**

**FOR REFERENCE ONLY. NOT TO BE USED FOR CONSTRUCTION PURPOSES.**



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www.toshiba.com/tams



**NOTE:**

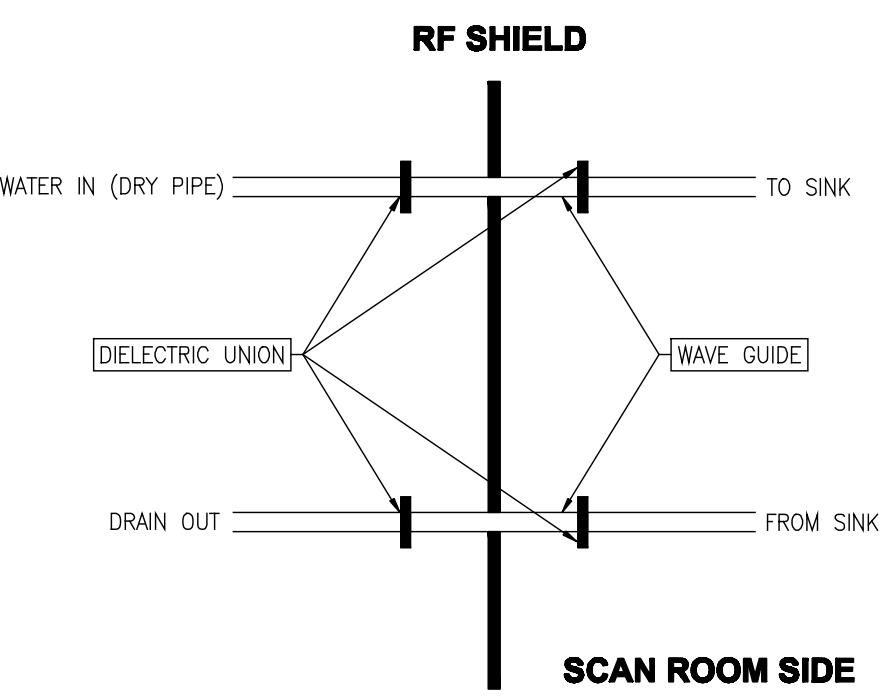
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**PLUMBING LEGEND**

ITEM	ITEM DESCRIPTION SUPPLIED BY TOSHIBA INSTALLED BY CUSTOMER / CONTRACTOR	REF.
A	MANIFOLD	1 P2
B	REFRIGERATOR CABINET	1 P2
C	DRAKE INDOOR HEAT EXCHANGER	1 P2
D	DRAKE OUTDOOR CHILLER UNIT	1 P2
E	(2) 1/2" FLEXIBLE HOSE FROM MANIFOLD TO REFRIGERATION. FIELD VERIFY LOCATION WITH TOSHIBA REPRESENTATIVE.	1 P2

ITEM	ITEM DESCRIPTION SUPPLIED / INSTALLED BY CUSTOMER / CONTRACTOR	REF.
F	DRAIN LOCATED FOR MANIFOLD & REFRIGERATOR. FIELD VERIFY EXACT LOCATION AT TIME OF INSTALLATION. DRAIN CAPACITY TO MEET OR EXCEED DISCHARGE CAPACITY.	1 P2
G	SUPPLY AND VENT RETURN LINE FROM MANIFOLD TO CHILLER BY PLUMBING CONTRACTOR. PROVIDE 1" HIGH PRESSURE COPPER PIPE AFTER UNITS ARE SET IN PLACE.	1 P2
H	SUPPLY AND VENT RETURN HARD PIPE BY PLUMBING CONTRACTOR.	2 P1



**NOTE:**  
A SINK IN THE SCAN ROOM IS NOT RECOMMENDED. IT WILL ONLY BE ACCEPTABLE IF A "DRY FILL" SYSTEM IS USED, AND PLUMBING INTO AND OUT OF THE SCAN ROOM MUST BE VIA WAVE GUIDES WITH DIELECTRIC UNIONS ON BOTH SIDES. THIS WILL PROVIDE BOTH RF FREQUENCY AND ELECTRICAL ISOLATION. PLEASE REFER TO ABOVE DETAILS.

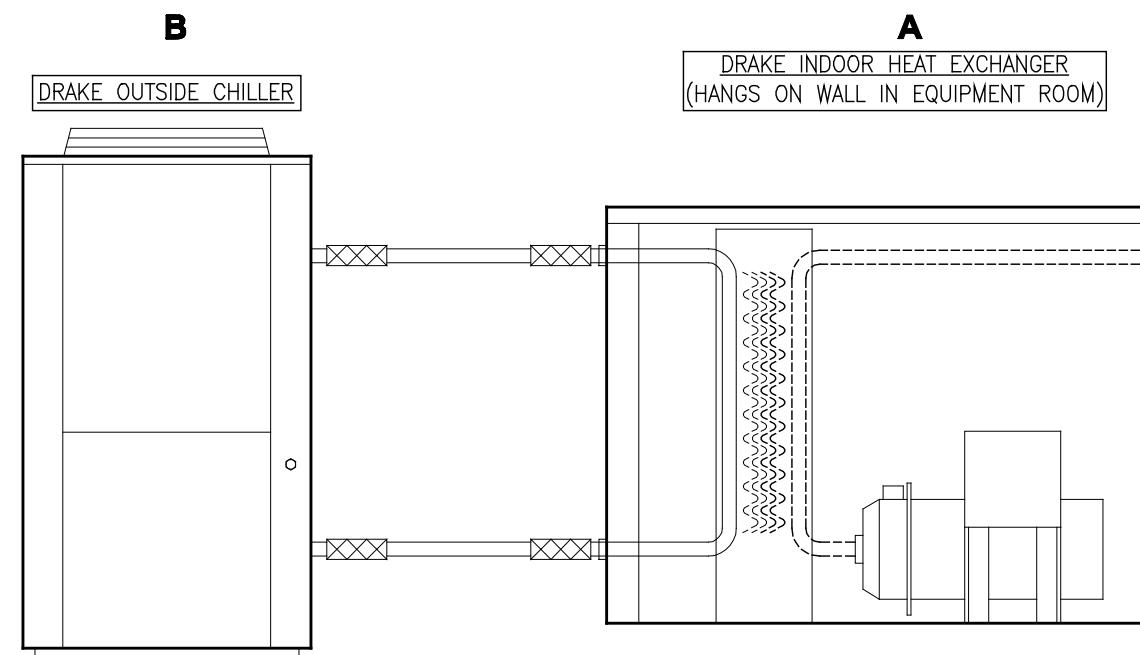
REVISED: 12-08-05

**1 SCAN ROOM SINK**

NOTE: ALL MATERIAL IN SCAN ROOM MUST BE NON FERROUS.

REVISED: 01-09-06

**"DUAL LOOP SYSTEM ONLY"**



SIZE	DISTANCE	LINEAL FEET	EQUIVALENT FEET
1"	40'	80'	110'
1 1/4"	110'	220'	275'
1 1/2"	240'	480'	600'
2"	960'	1820'	2400'

DISTANCE = PHYSICAL STRAIGHT LINE POINT A TO POINT B - INDOOR HEAT EXCHANGER "IHE" TO OUTDOOR CHILLER UNIT "OCU" (ONE WAY).

LINEAL FEET = THE MEASURED LENGTH OF STRAIGHT TUBING REQUIRED TO PIPE BETWEEN THE OUTDOOR CHILLER "OCU" & THE INDOOR HEAT EXCHANGER "IHE" IN THE SUPPLY PLUS THE RETURN LINES.

EQUIVALENT FEET = TAKES INTO ACCOUNT THE FRICTIONAL LOSSES WITHIN A PIPING SYSTEM CAUSED BY BOTH THE STRAIGHT TUBING AS WELL AS VARIOUS VALVES & FITTINGS USED WITHIN THE SYSTEM.

NOTE: THESE LENGTHS ARE BASED ON USING A 40% SOLUTION OF PROPYLENE GLYCOL & WATER & A FLOW RATE OF 17 GPM. FOR QUESTIONS, PLEASE CONTACT OTTO WEISS @ DRAKE 888) 289-7299.

REVISED: 05-01-06

**2 GLYCOL LINE SIZING B/W "IHE" & "OCU"**

**TYPICAL DRAWING**

(MRI SCAN ROOM – VANTAGE/TITAN)

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DATE: 01-07-08

SCALE: 1/4" = 1'-0"

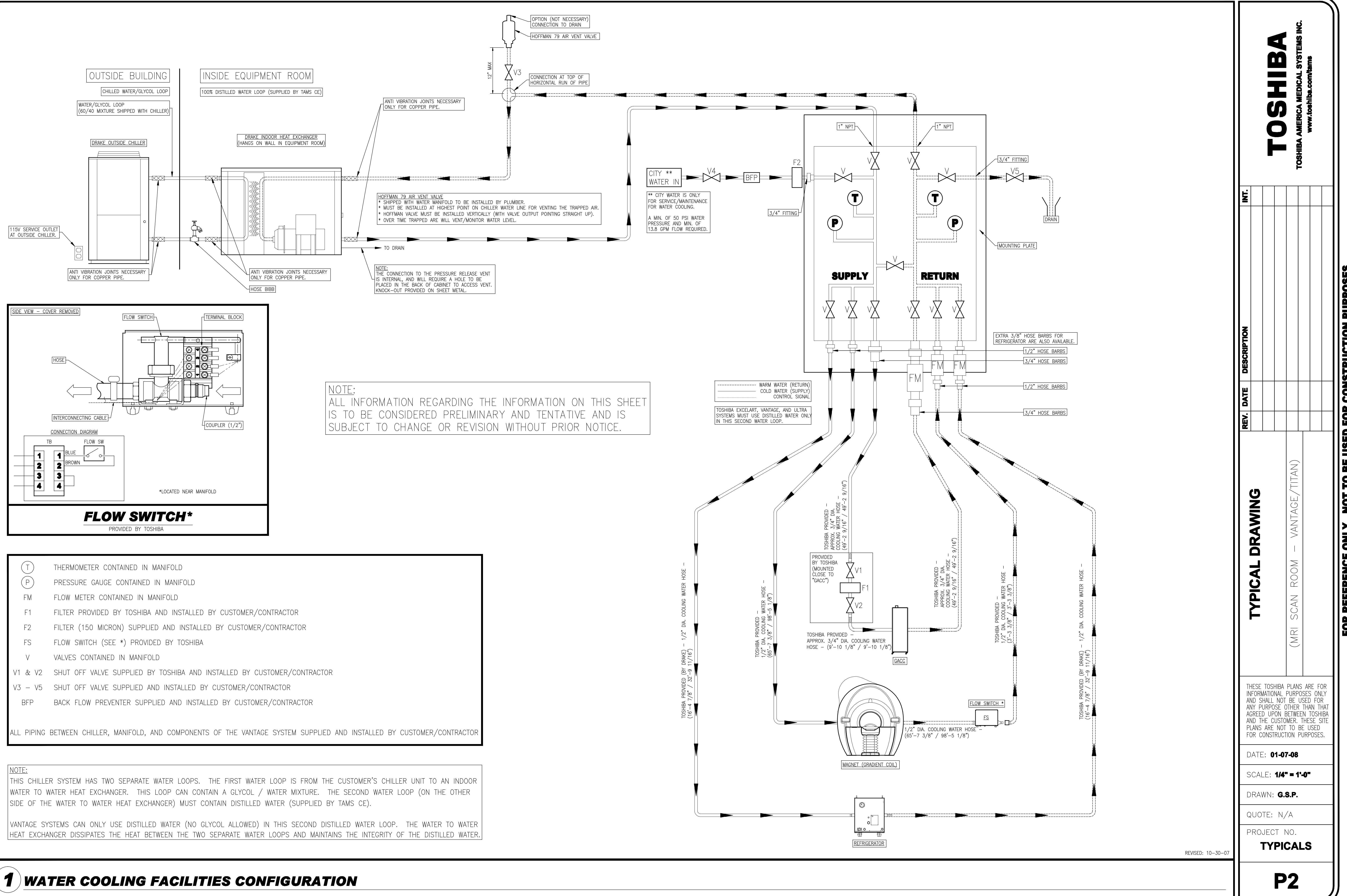
DRAWN: G.S.P.

QUOTE: N/A

PROJECT NO.

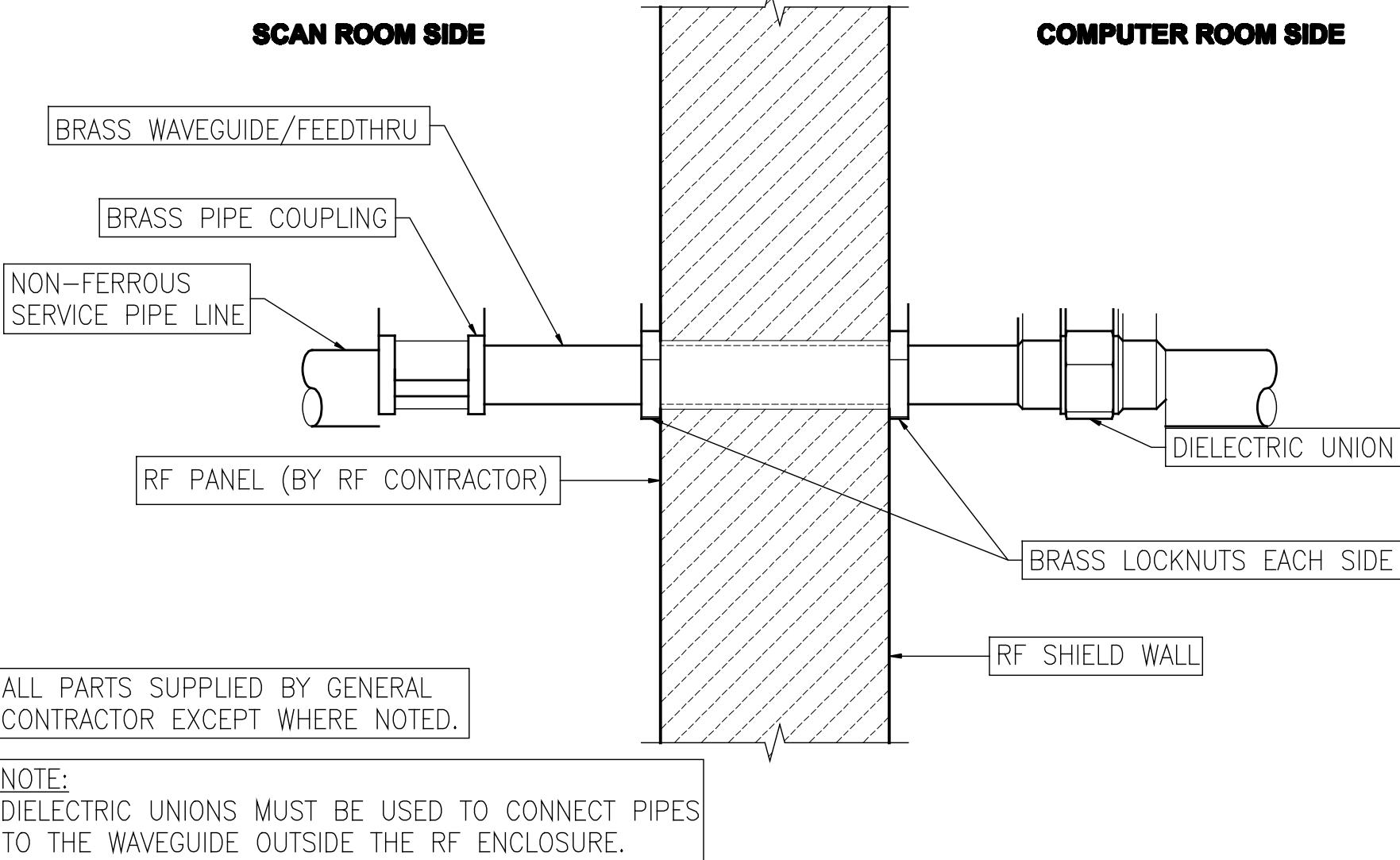
**TYPICALS**

**P1**



FOR REFERENCE ONLY NOT TO BE USED FOR CONSTRUCTION PURPOSES

TOSHIBA RECOMMENDS THAT A PRE-ACTION PROTECTION SYSTEM (DRY PIPE SPRINKLER SYSTEM) BE INSTALLED BY THE CUSTOMER/CONTRACTOR. TOSHIBA RECOMMENDS THE PRE-ACTION PROTECTION SYSTEM TO MINIMIZE GROUNDING ISSUES THAT CAN ARISE UTILIZING WET TYPE SPRINKLER SYSTEMS. A WET TYPE SPRINKLER SYSTEM CAN BE UTILIZED PROVIDED THE CUSTOMER ASSUMES RESPONSIBILITY OF ALL GROUNDING AND IMAGE ARTIFACT ISSUES THAT MAY RESULT FROM THE USE OF WET SYSTEM. IF A WET-TYPE SPRINKLER SYSTEM IS USED, THE LOCATION OF THE PIPE PENETRATION, MATERIAL AND CONSTRUCTION IS STRICTLY LIMITED AS SHOWN BELOW.



STANDING WATER WITHIN THE SPRINKLER PIPES IN THE RF ENCLOSURE HAS BEEN KNOWN TO ACT AS A GROUND AND A CAUSE OF IMAGE ARTIFACTS. THESE ISSUES CAN DEVELOP OVERTIME.

WAVE GUIDES ARE REQUIRED FOR SPRINKLER LINES. THE REQUIRED LENGTH OF THE WAVE GUIDE DEPENDS ON THE DIAMETER OF THE SPRINKLER LINE.

EXCEPT FOR THE BLAZE MASTER PVC PIPE FIRE SPRINKLER SYSTEM, WHICH CANNOT BE USED AS PART OF A WET PIPE SYSTEM, ALL SPRINKLER LINES ARE CONDUCTIVE. THEY ARE ALSO MECHANICALLY ATTACHED TO THE BUILDING, WHICH MAKES THEM GROUNDED. THUS IF A SPRINKLER LINE IS ATTACHED TO THE RF ENCLOSURE, THE RF ENCLOSURE ALSO BECOMES GROUNDED TO THE BUILDING.

WET SPRINKLER SYSTEM CAN BE SPECIFIED FOR USE IN THE RF ENCLOSURE. STANDARD STEEL PIPES CAN BE USED OUTSIDE THE RF ENCLOSURE, BUT COPPER, BRASS, OR 304 STAINLESS STEEL PIPES SHOULD BE USED WITHIN THE RF ENCLOSURE. THE WAVE GUIDE FOR THE SPRINKLER PIPE MUST BE LOCATED WITHIN 3' FROM THE EDGE OF THE FILTER PANEL.

IF A BRASS OR OTHER APPROPRIATE FEED-THROUGH WAVE GUIDE IS INSTALLED ABOVE THE FILTER PANEL AREA, THE SPRINKLER PIPE OUTSIDE THE RF ENCLOSURE MUST BE CONNECTED TO THE WAVE GUIDE VIA A DIELECTRIC UNION TO ISOLATE THE GROUNDED SPRINKLER PIPE FROM THE RF ENCLOSURE.

THE SPRINKLER LINE INSIDE THE RF ENCLOSURE MUST BE CONNECTED DIRECTLY TO THE WAVE GUIDE, WHICH IS GROUNDED TO THE RF ENCLOSURE. ALL SPRINKLER HEADS WITHIN THE RF ENCLOSURE MUST ORIGINATE FROM THIS PRIMARY LINE.

INSTALLATION OF A DEDICATED SHUT-OFF VALVE FOR THE SPRINKLER SYSTEM FOR THE RF ENCLOSURE IS STRONGLY RECOMMENDED.

THE LOCATION OF THE PENETRATION MUST BE WITHIN 30" ABOVE THE GROUND BUS BAR, WHICH IS THE CENTRAL REFERENCE GROUND.

DISSOCIATION UNIONS MUST BE USED TO CONNECT PIPES TO THE WAVE GUIDE OUTSIDE THE RF ENCLOSURE. ALL WET PIPE SYSTEMS MUST ENTER THE RF ENCLOSURE DIRECTLY ABOVE THE FILTER PANEL.

ONLY BRASS AND COPPER COMPONENTS CAN BE USED IN THE SCAN ROOM. ALL SPRINKLER DROPS THAT PENETRATE THE SCAN ROOM MUST BE ELECTRICALLY BONDED TO THE SCAN ROOM CEILING, AND MUST BE ELECTRICALLY DETACHED FROM THE MAIN SPRINKLER PIPE BY A NONCONDUCTIVE SLEEVE.

IF A SMOKE DETECTOR SYSTEM IS REQUIRED, DO NOT USE A CALL/RECEIVE SYSTEM.

BY SIGNING BELOW THE CUSTOMER/CONTRACTOR ACKNOWLEDGES AND ACCEPTS RESPONSIBILITY OF ANY POTENTIAL ISSUES THAT CAN BE DEVELOP DUE TO CONSTRUCTION, INSTALLATION OR USE OF A WET-TYPE FIRE SPRINKLER SYSTEM. IN THE EVENT THAT ANY ISSUES OR PROBLEMS DEVELOP DUE TO THE WET-TYPE SPRINKLER SYSTEM, THE CUSTOMER/CONTRACTOR AGREES TO REPAIR, MODIFY, OR REPLACE WET-TYPE FIRE SPRINKLER SYSTEM. TOSHIBA RECOMMENDS A PRE-ACTION PROTECTION SYSTEM (DRY-TYPE SPRINKLER SYSTEM) AND THEREFORE, SHALL NOT ASSUME ANY COSTS OR DOWNTIME PENALTIES ASSOCIATED WITH THE REPAIR, MODIFICATION, OR REPLACEMENT OF WET-TYPE FIRE SPRINKLER SYSTEM.

THE TOSHIBA PROJECT INSTALLATION MANAGER IS TO FAX DETAIL WITH CUSTOMER SIGNATURE INCLUDED WITH SITE NAME AND TAMS PROJECT NUMBER TO TAMS SITE PLANNING DEPARTMENT, ATTENTION SITE PLANNING ADMINISTRATOR.

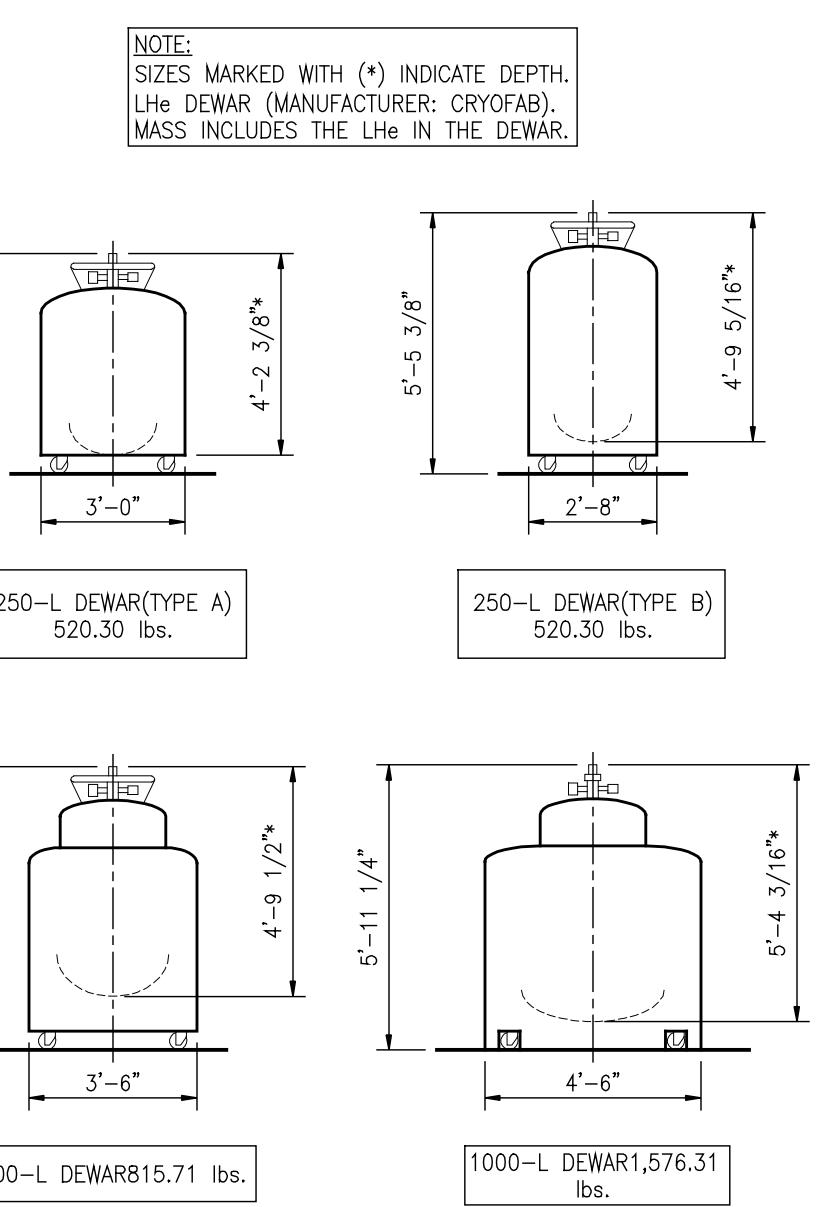
FAX # (714) 544-5893

PROJECT # \_\_\_\_\_

SITE NAME: \_\_\_\_\_

CUSTOMER/CONTRACTOR SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

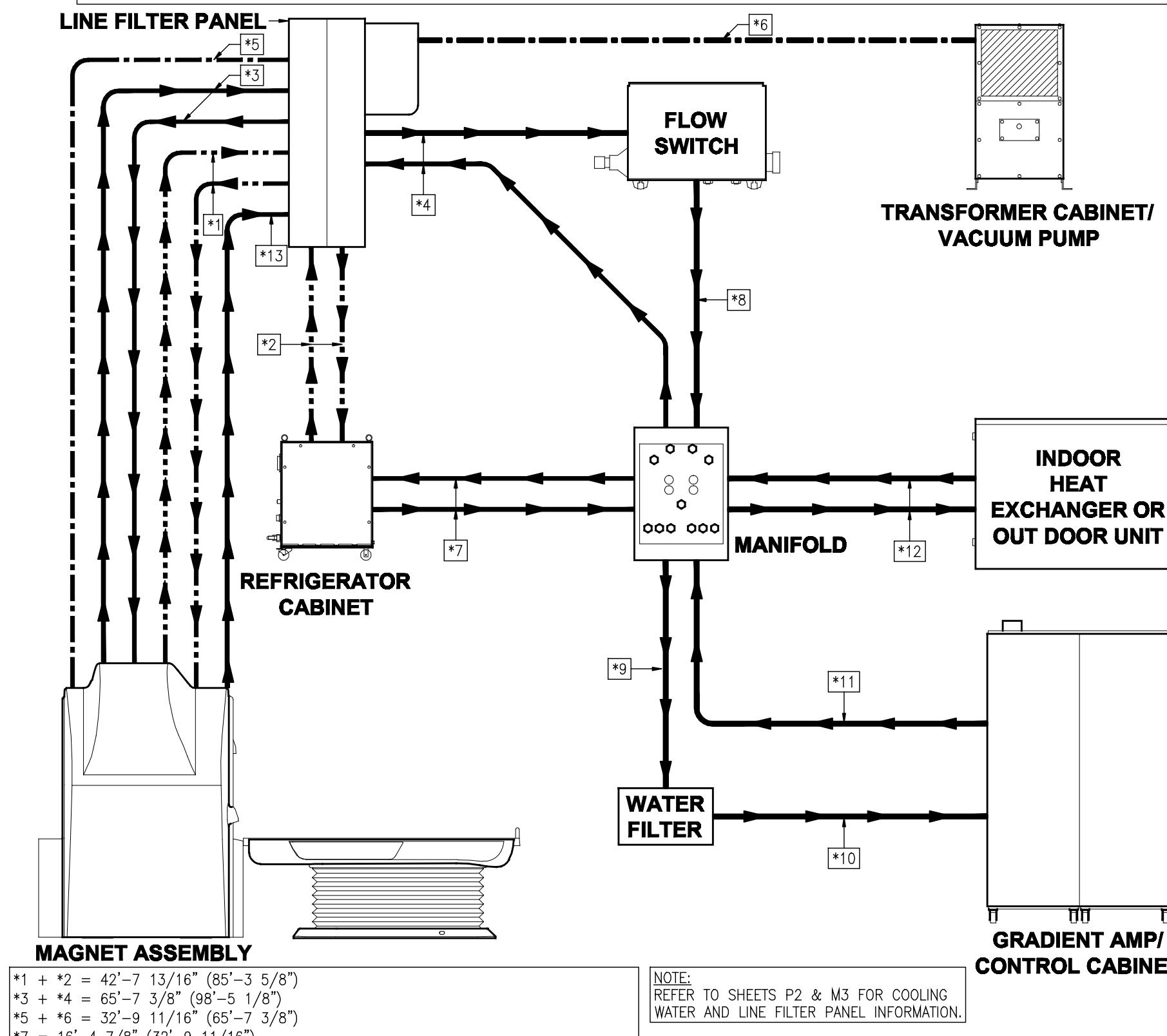
REVISED: 10-20-06



#### LHe VESSELS - DEWARS

1. THE SIZE OF A LHe DEWAR DIFFERS ACCORDING TO THE SUPPLIER. BE SURE TO CHECK THE SHAPE OF THE DEWAR IN ADVANCE.
2. BE SURE TO USE A NONMAGNETIC DEWAR (STAINLESS STEEL, ALUMINUM).
3. 11'-9 3/4" CLEARANCE IS REQUIRED TO INSERT THE TRANSFER TUBE INTO THE HELIUM CONTAINER.
4. INSURE THE DEWARS HAVE A CLEAR DELIVERY PATH TO MAGNET (CONSIDER DOORS, HALLWAYS, ELEVATORS, ETC.).
5. SET ASIDE AREA FOR HELIUM DEWAR STORAGE DURING INSTALLATION.

NOTE:  
IT IS INSTALLATION COORDINATOR'S RESPONSIBILITY FOR VERIFYING AND ORDERING EXTENDED HOSES/PIPES.



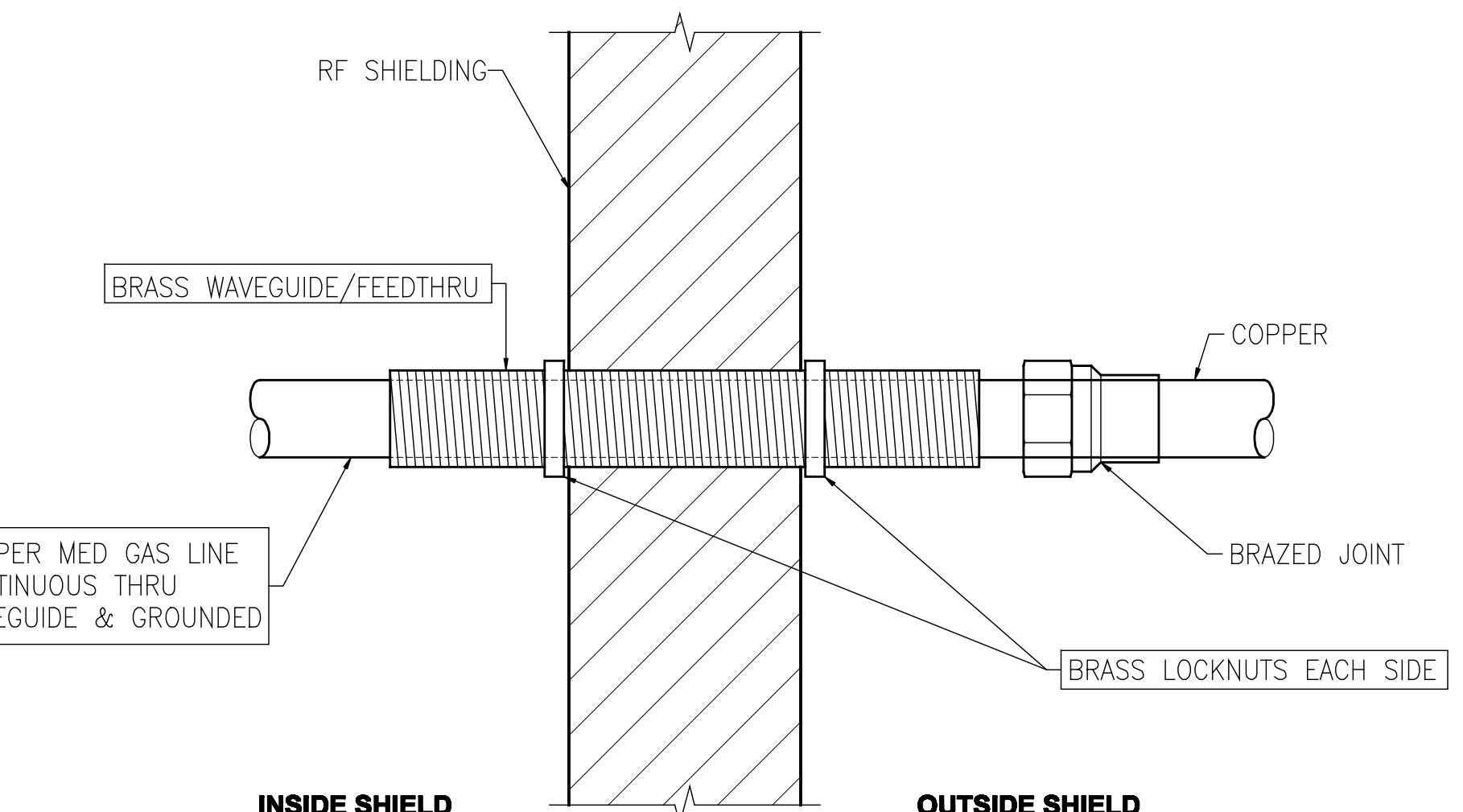
\*1 + \*2 = 42'-7 13/16" (85'-3 5/8")  
 \*3 + \*4 = 65'-7 3/8" (98'-5 1/8")  
 \*5 + \*6 = 32'-9 11/16" (65'-7 3/8")  
 \*7 = 16'-4 7/8" (32'-9 11/16")  
 \*8 = 3'-3 3/8"  
 \*9 = 49'-2 9/16" (49'-2 9/16")  
 \*10 = 9'-10 1/8" (9'-1 1/8")  
 \*11 = 49'-2 9/16" (49'-2 9/16")  
 \*12 - PROVIDED BY CUSTOMER/CONTRACTOR. EXACT LENGTH TO BE DETERMINED.  
 \*13 = 49'-2 9/16" (62'-4 1/16")  
 THE DISTANCES SHOWN INDICATE THE STANDARD LENGTH (MAXIMUM LENGTH IN BRACKETS).

REVISED: 01-07-08

## 2 DEWARS - LHe REPLENISHMENT

SCALE: 1/4" = 1'-0"

### EXAMPLE OF MEDICAL GAS THROUGH DUCT (PER CODE)



NOTE:  
 1. THE THROUGH DUCT OF THE MEDICAL GAS PIPE MUST BE WITHIN APPROXIMATELY 2'-0" OF THE LINE FILTER PANEL.  
 2. THE FINAL MEDICAL GAS CONNECTION TO THE WAVEGUIDE CANNOT BE MADE UNTIL GROUND ISOLATION MONITORING IS COMPLETE.  
 3. THE MEDICAL GAS MUST BE GROUNDED TO THE WAVEGUIDE & RF SHIELDING.  
 4. MOUNT AS CLOSE AS POSSIBLE TO LINE FILTER PANEL.

REVISED: 05-01-06

## 3 LIQUID & GAS HOSE CONNECTIONS

SCALE: NOT TO SCALE

NOTE:  
ALL INFORMATION REGARDING THE INFORMATION ON THIS SHEET IS TO BE CONSIDERED PRELIMINARY AND TENTATIVE AND IS SUBJECT TO CHANGE OR REVISION WITHOUT PRIOR NOTICE.

### TYPICAL DRAWING

(MRI SCAN ROOM - VANTAGE/TITAN)

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DATE: 01-07-08

SCALE: 1/4" = 1'-0"

DRAWN: G.S.P.

QUOTE: N/A

PROJECT NO.

**TYPICALS**

## 1 TYPICAL SPRINKLER PENETRATION

SCALE: NOT TO SCALE

## 4 TYPICAL MEDICAL GASES DETAILS (OPTIONAL)

SCALE: NOT TO SCALE

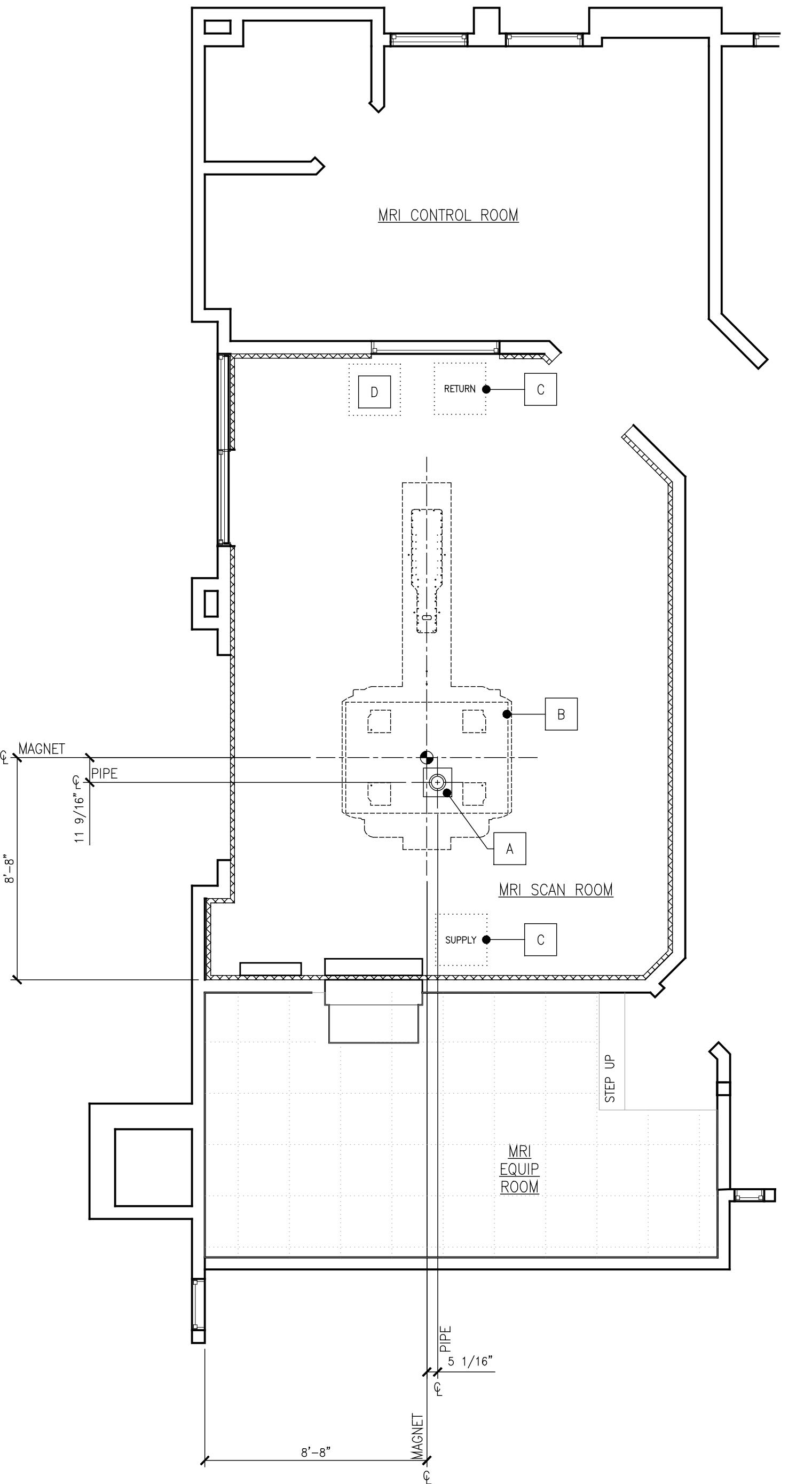


# **Made for Life**

# **MECHANICAL LAYOUT**

## NOTE:

ALL INFORMATION REGARDING THE INFORMATION ON THIS SHEET IS TO BE CONSIDERED PRELIMINARY AND TENTATIVE AND IS SUBJECT TO CHANGE OR REVISION WITHOUT PRIOR NOTICE.



# **MECHANICAL LEGEND**

ITEM	ITEM DESCRIPTION SUPPLIED / INSTALLED BY CUSTOMER / CONTRACTOR	RE
A	EMERGENCY GHe DISCHARGE PIPE & RF SHIELDING OPENING	1-5 M2
B	AREA FOR EMERGENCY VENTILATION DUCT WORK (1060 CFM)	-- --
C	RECOMMENDED SUPPLY/RETURN LOCATION OF AIR CONDITIONING	-- --
D	RECOMMENDED PASS-THRU WAVE GUIDE FOR PRESSURE EQUALIZATION	-- --

NOTE:  
ALL MATERIAL IN SCAN ROOM MUST BE NON FERROUS.

ENTIRE EMERGENCY GHE DISCHARGE PIPE MUST BE MADE FROM ALUMINUM OR STAINLESS STEEL.

REVISED: 05-01-08

**TOSHIBA**

[www.toshiba.com/tams](http://www.toshiba.com/tams)

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三：01-07-08

LE: **1/4" = 1'-0"**

WN · G.S.P.

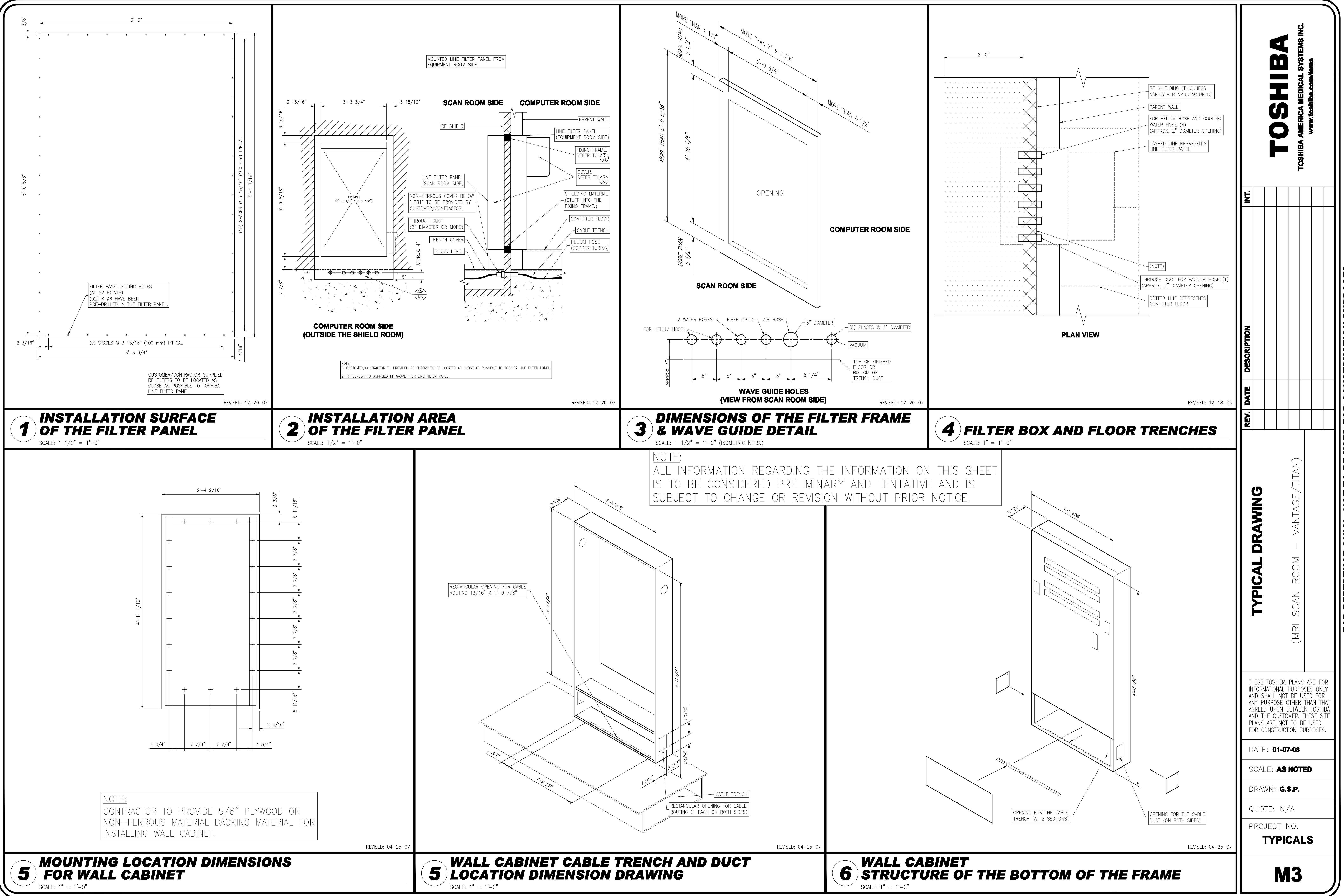
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PROJECT NO.

## **TYPICALS**

M1





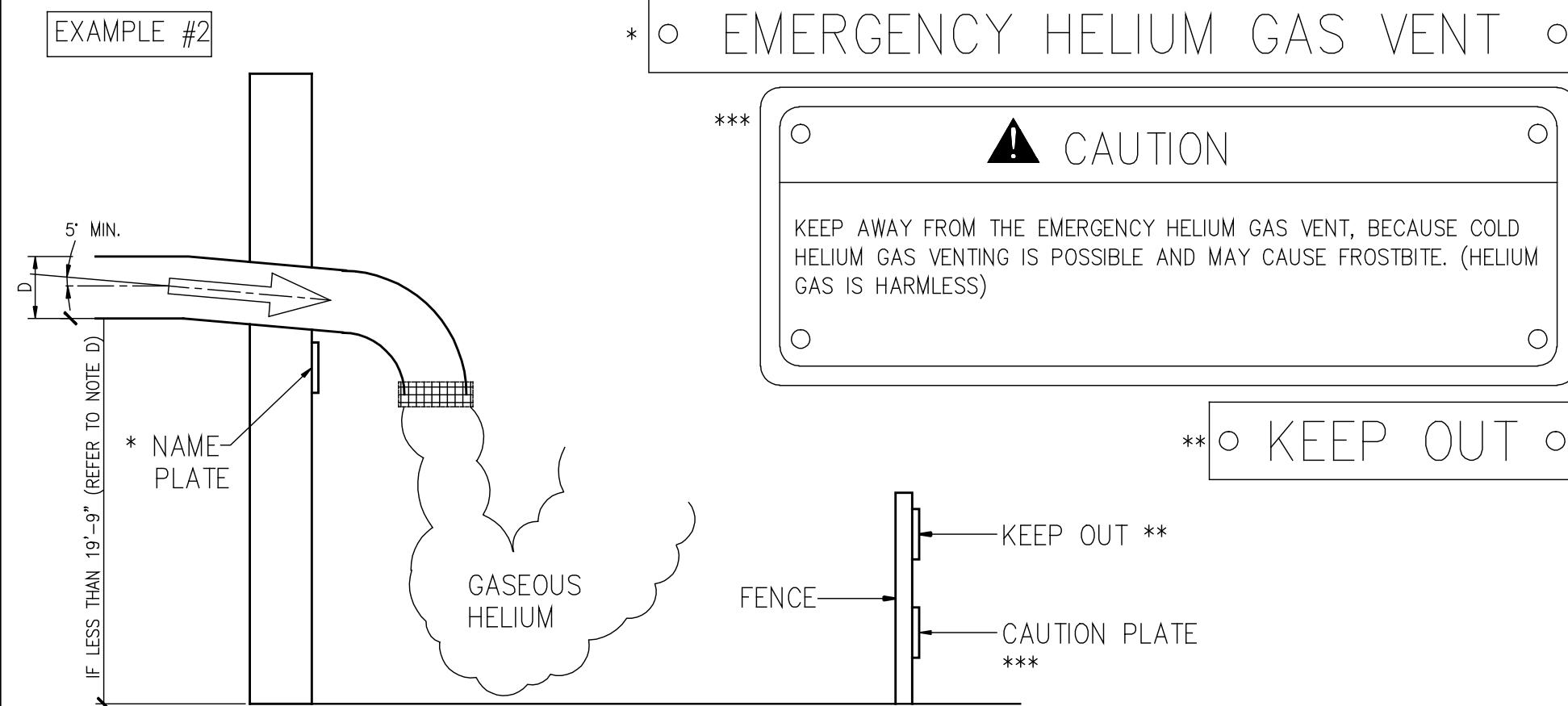
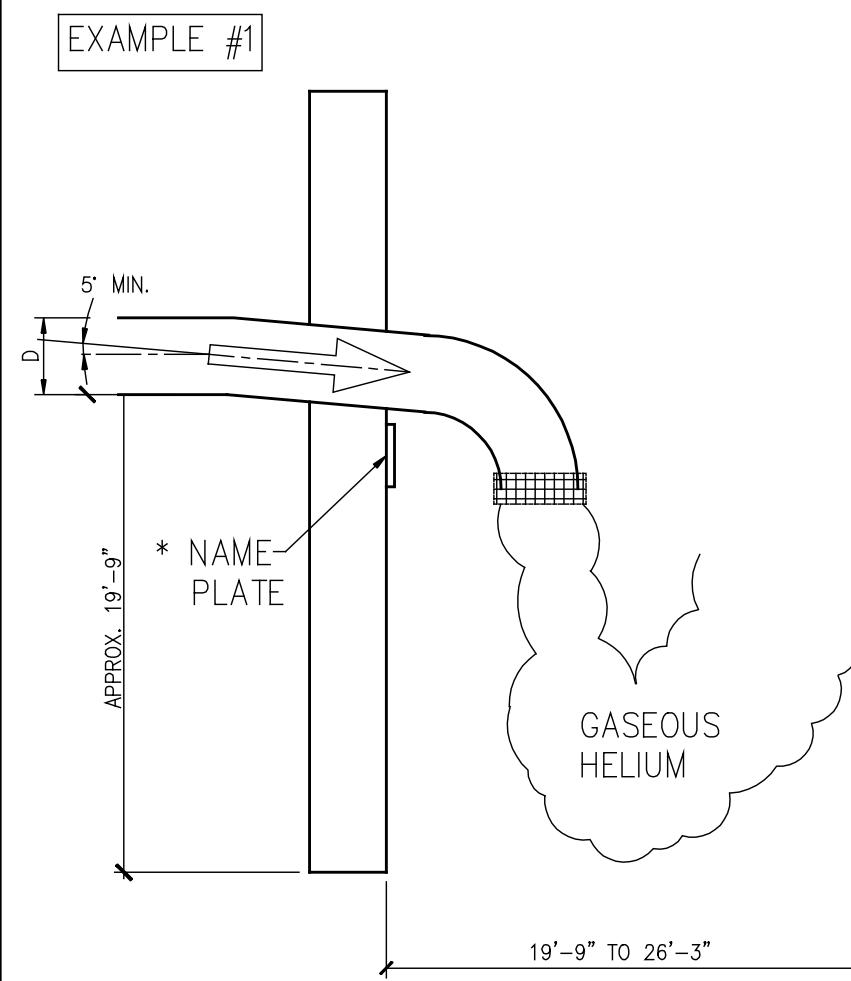
**MATERIAL:**  
ALUMINUM OR STAINLESS STEEL.

NOTE:

IF QUENCHING OCCURS, APPROXIMATELY 17,305 FT<sup>3</sup> OF GASEOUS HELIUM IS DISCHARGED TO THE OUTSIDE IN APPROXIMATELY 20 MINUTES.

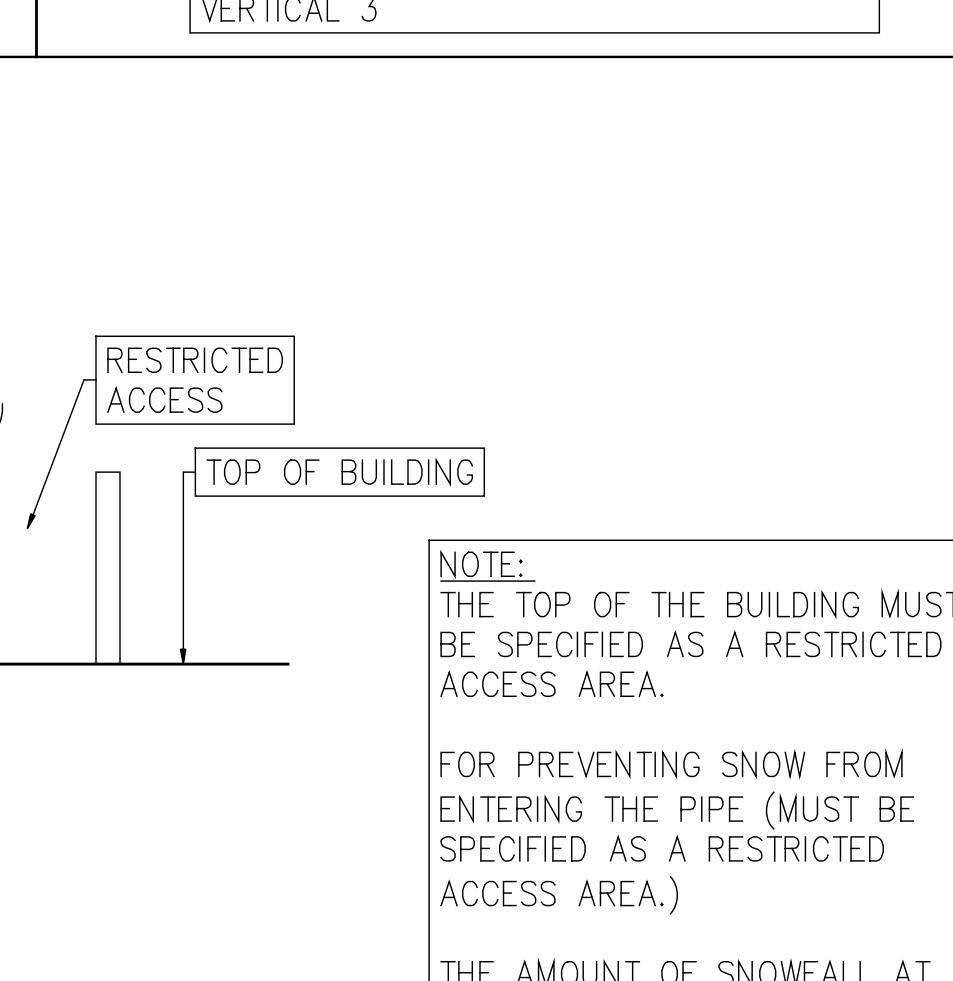
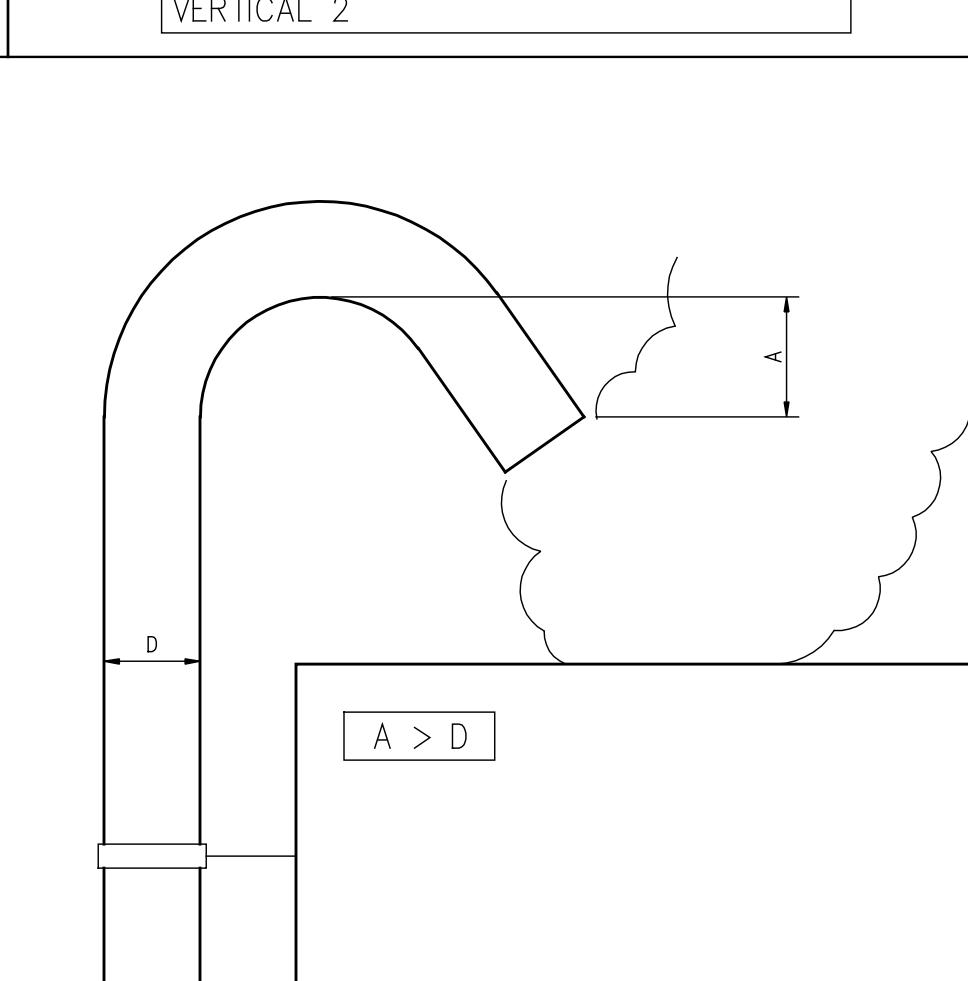
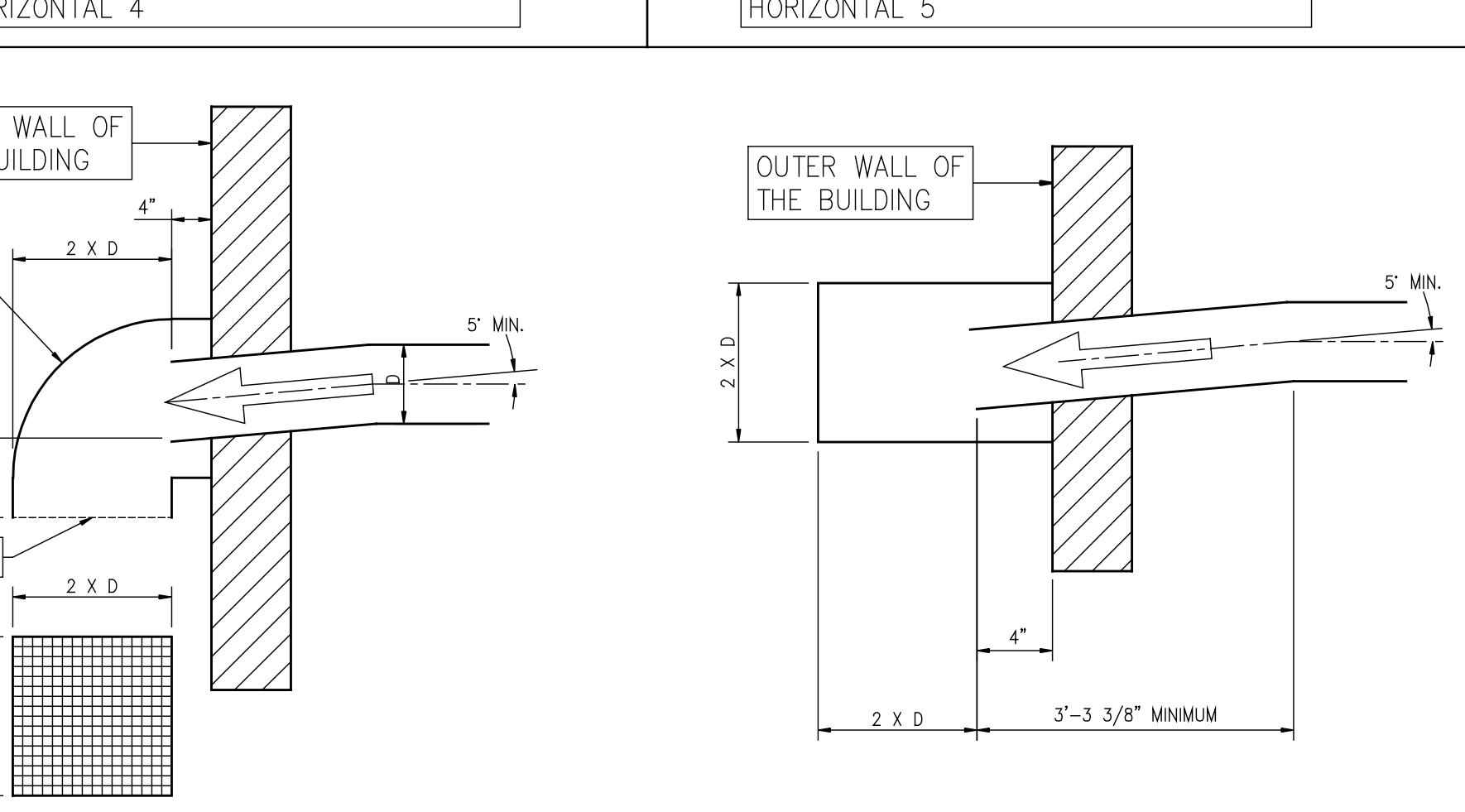
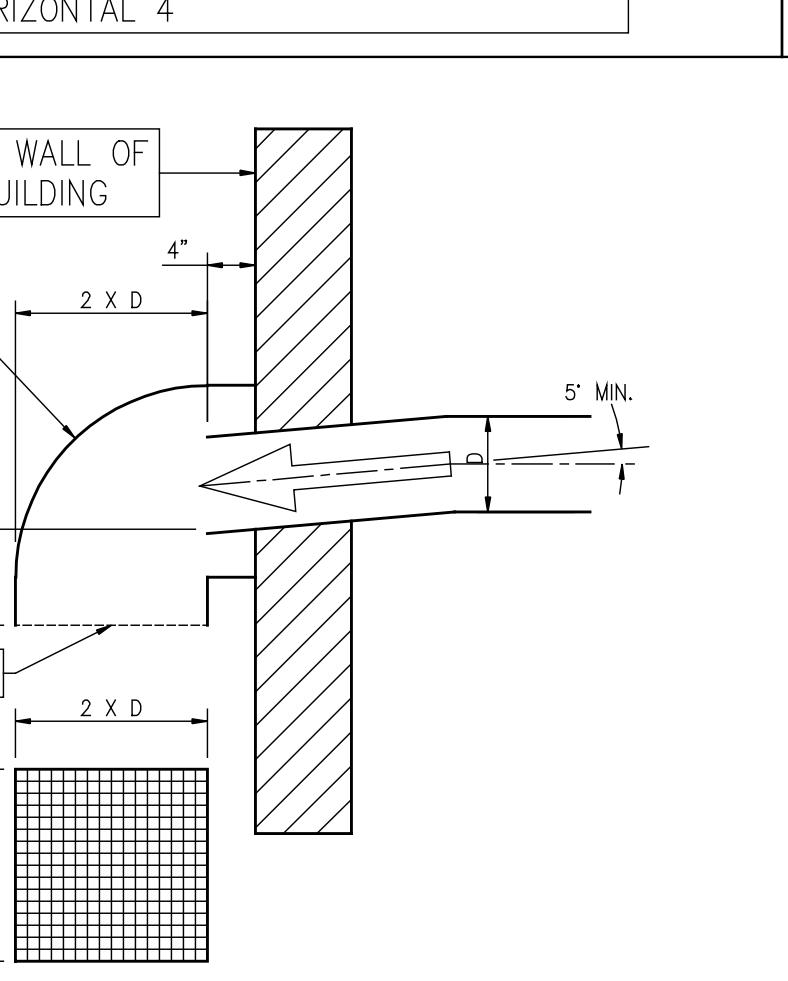
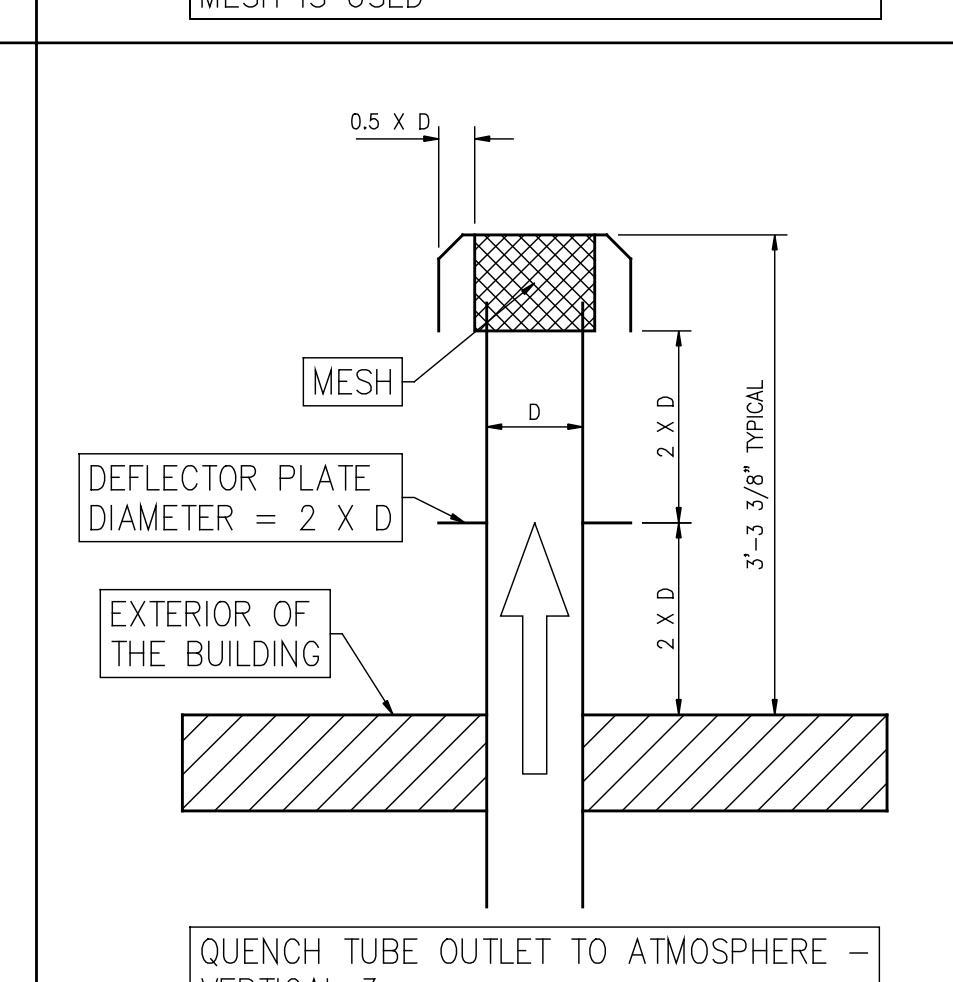
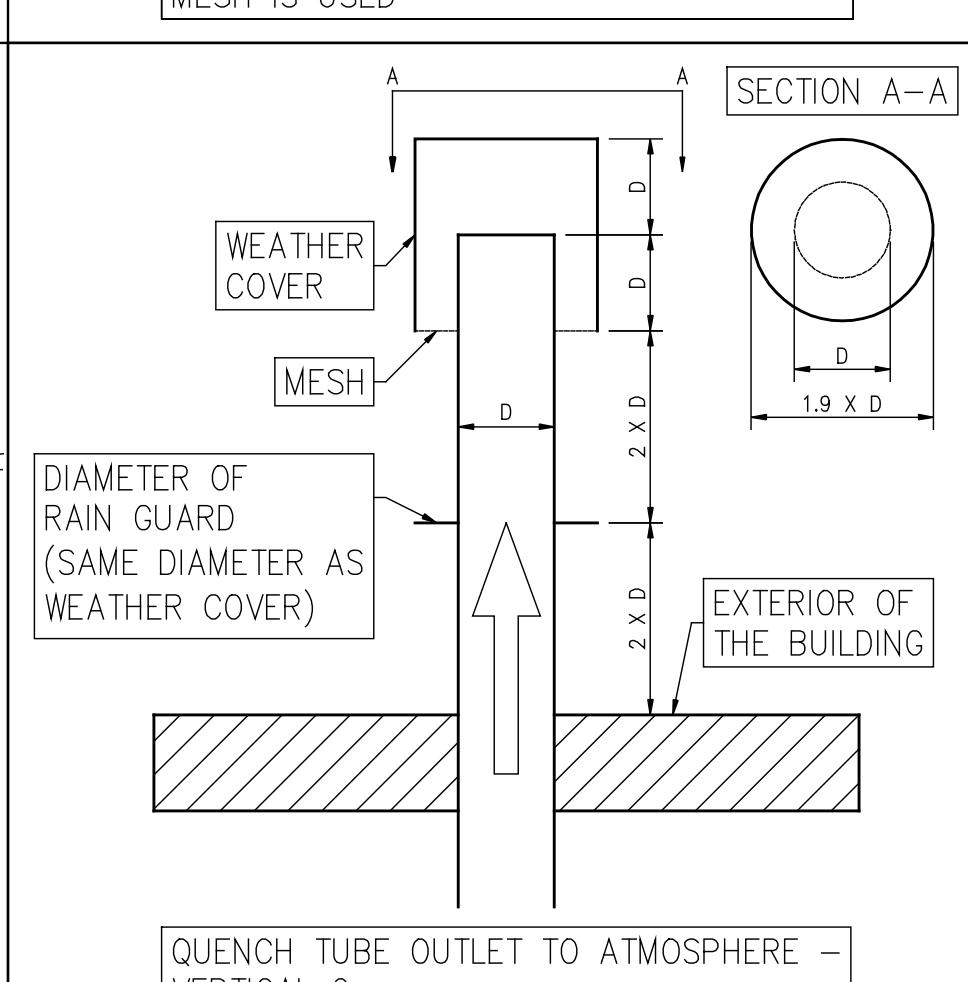
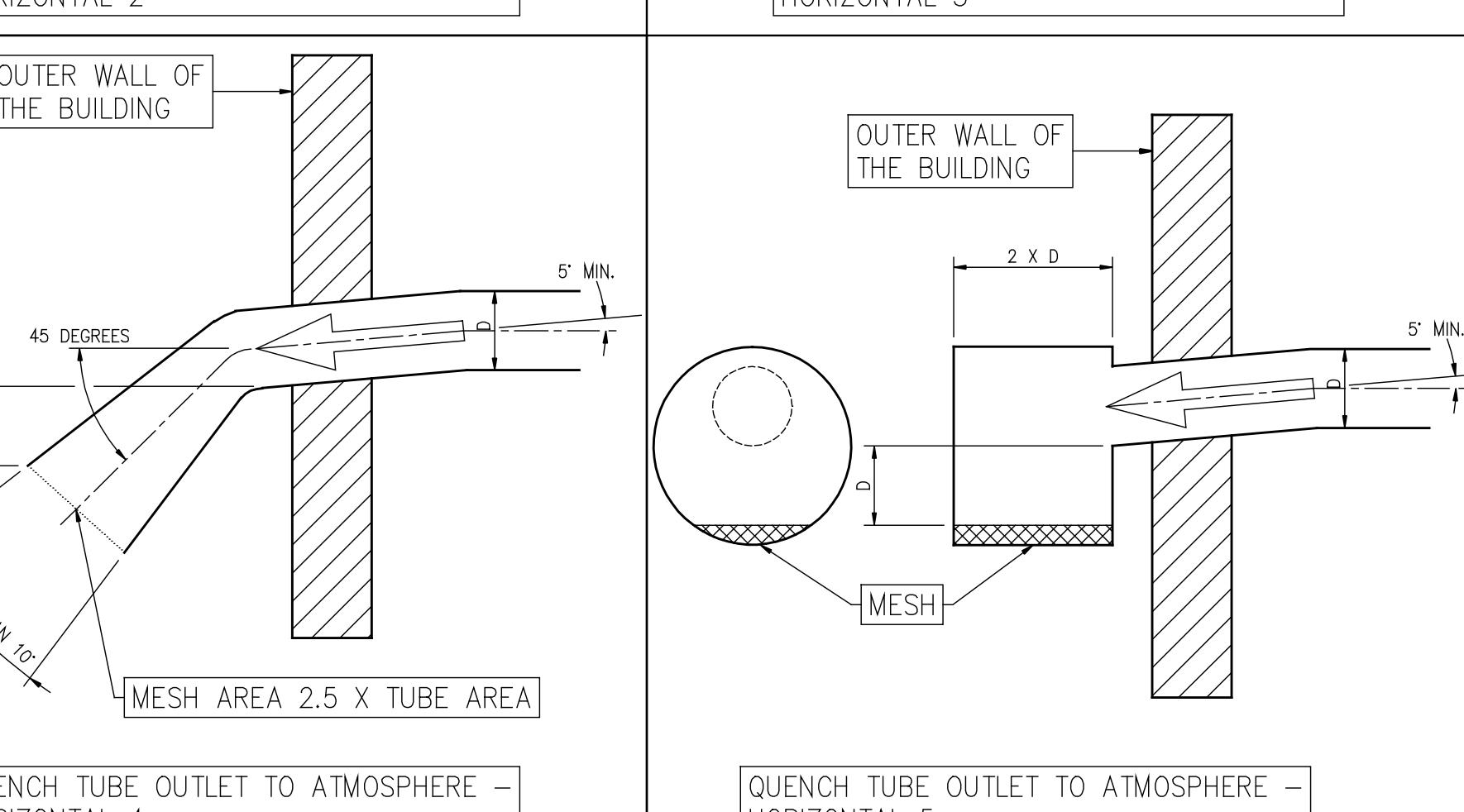
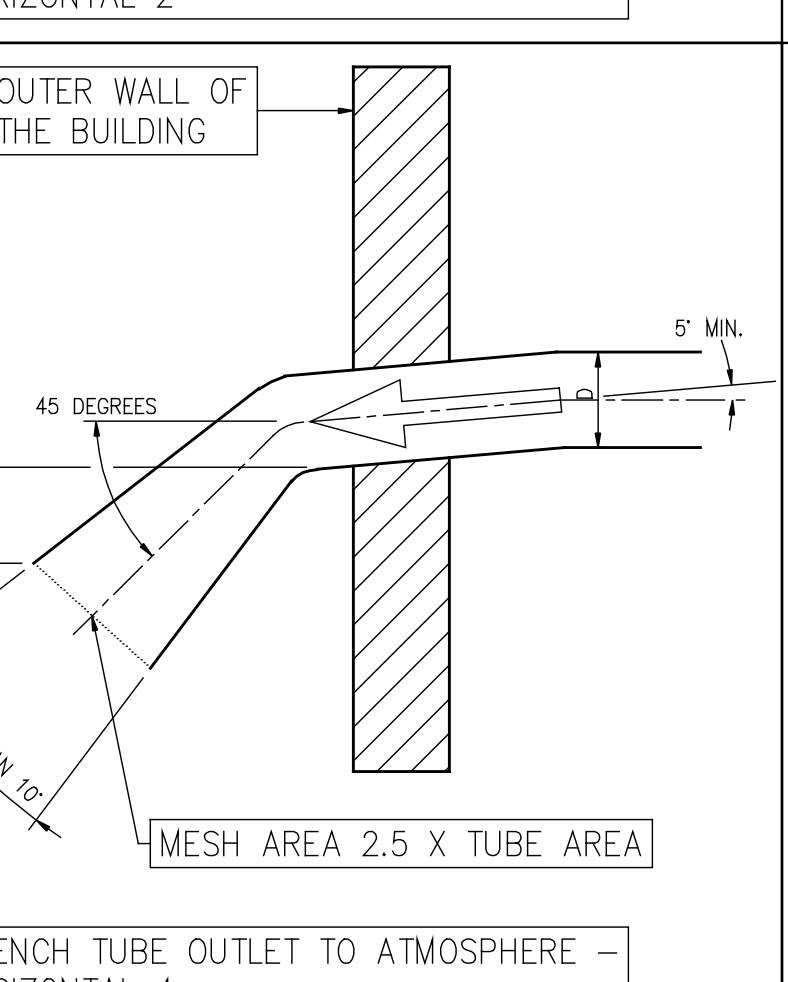
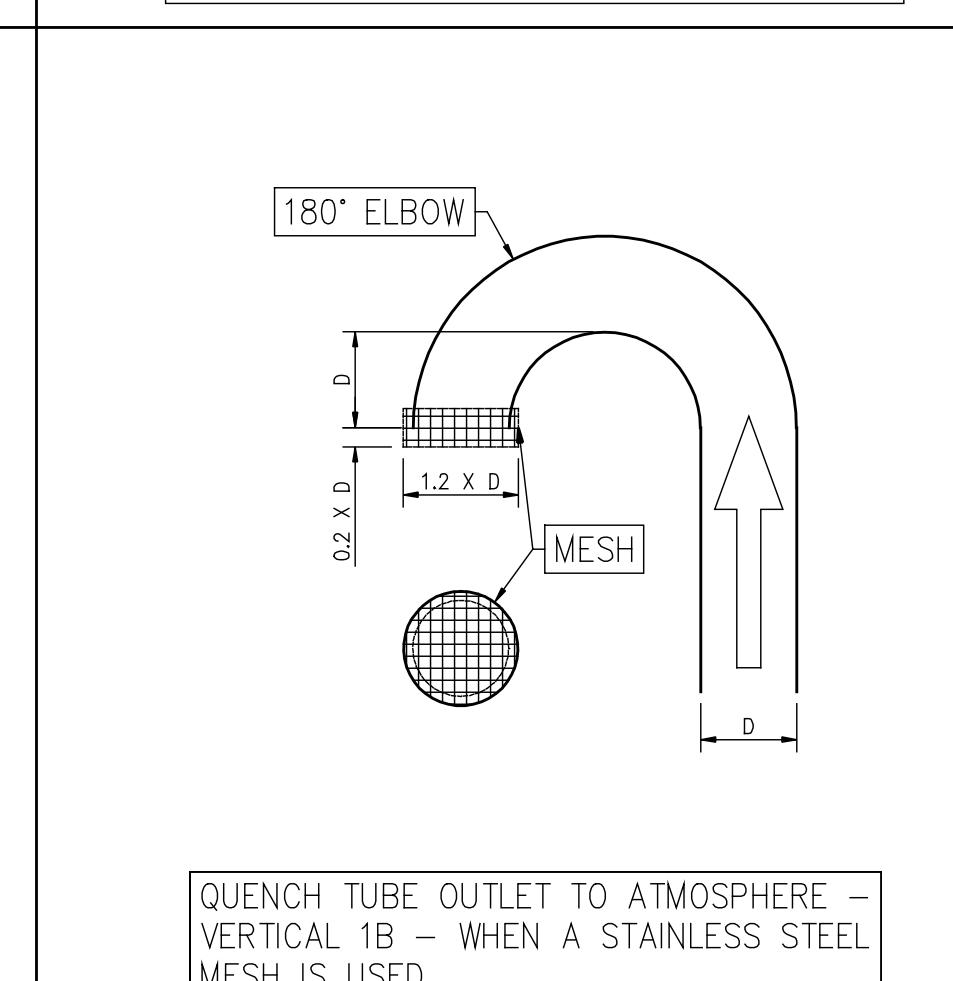
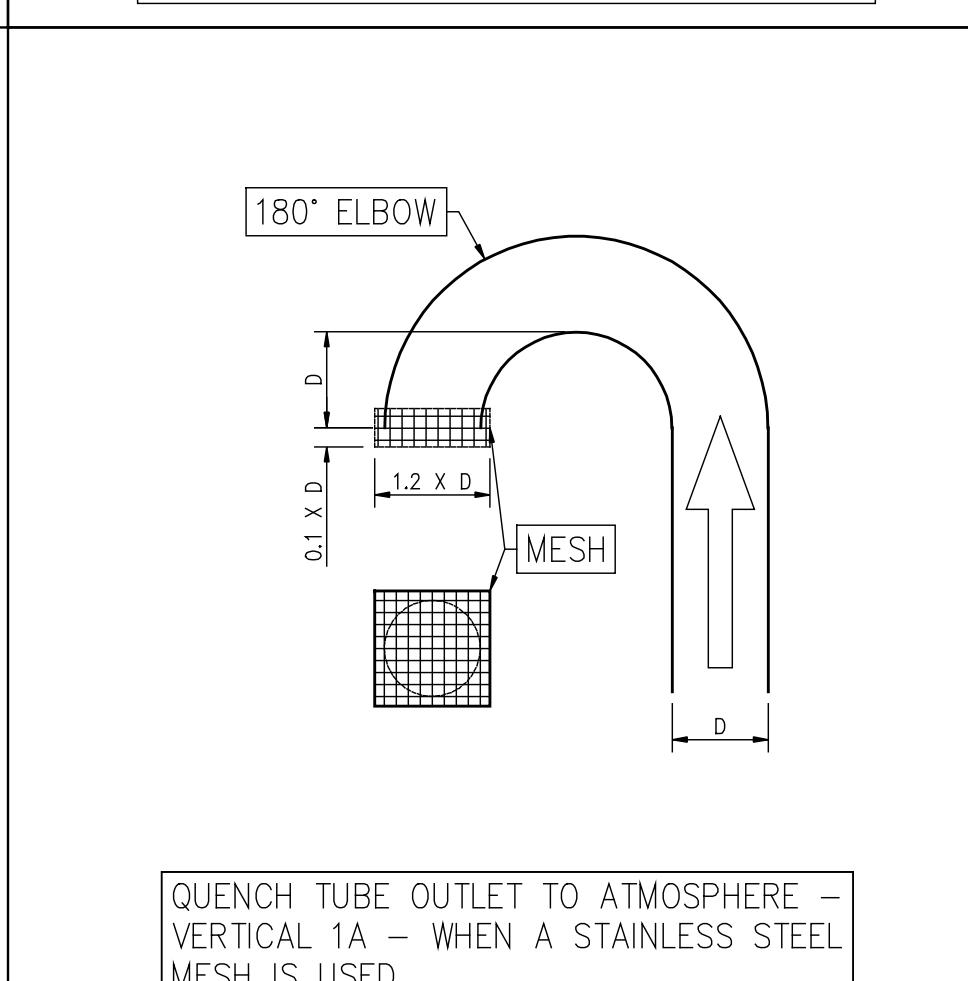
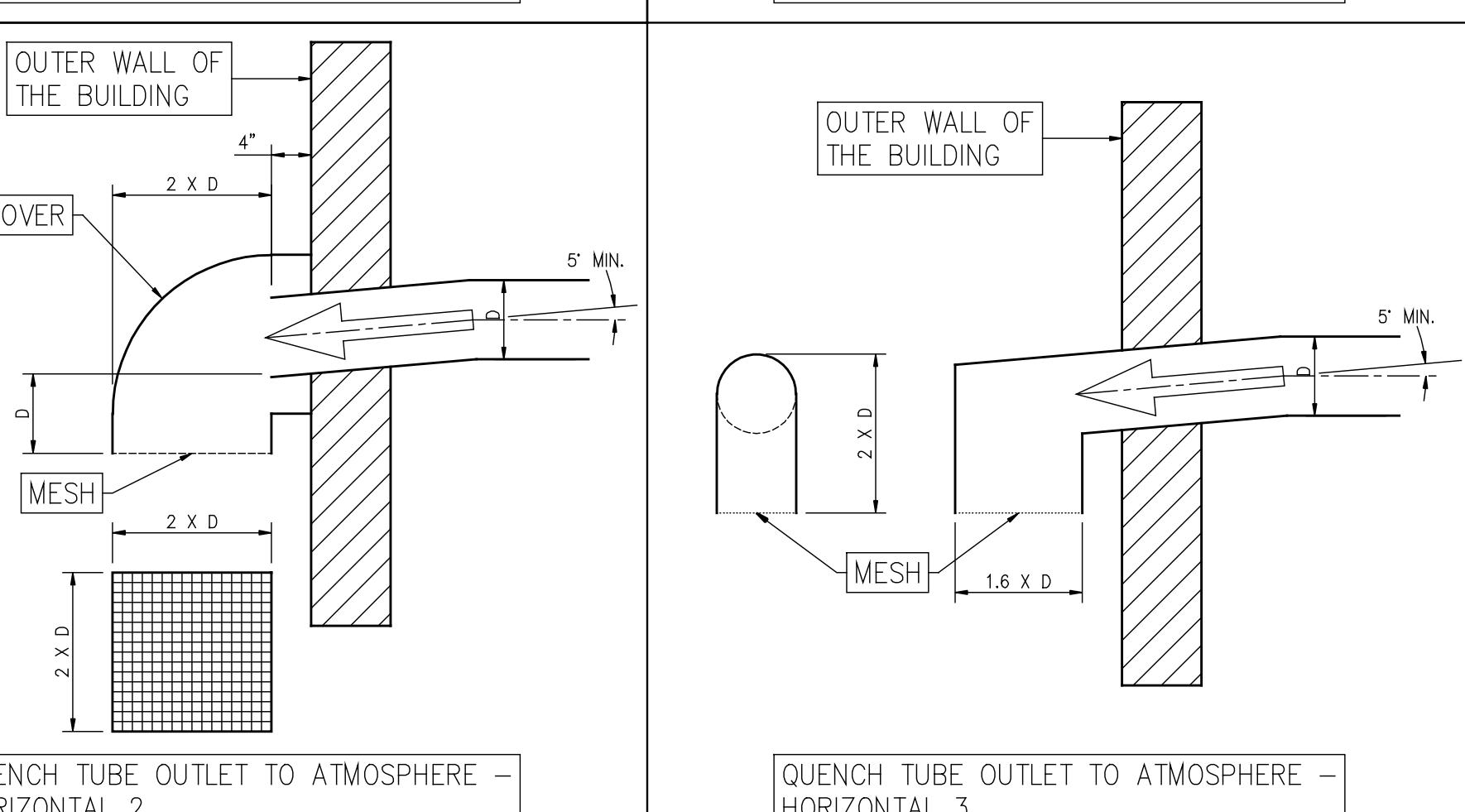
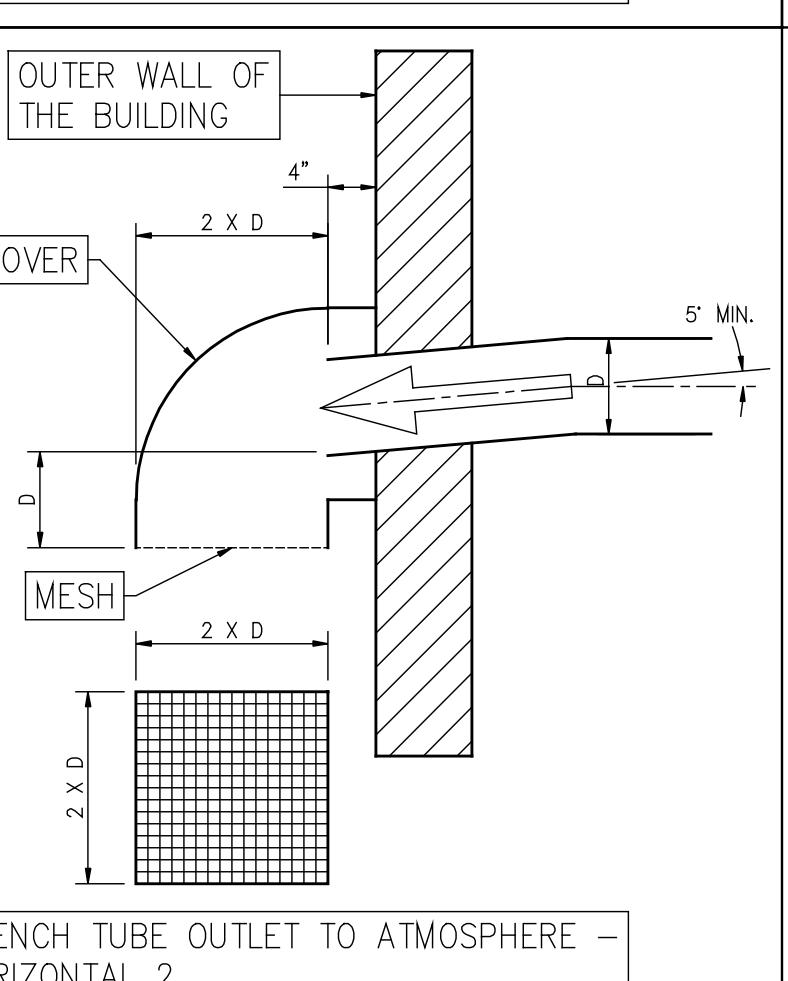
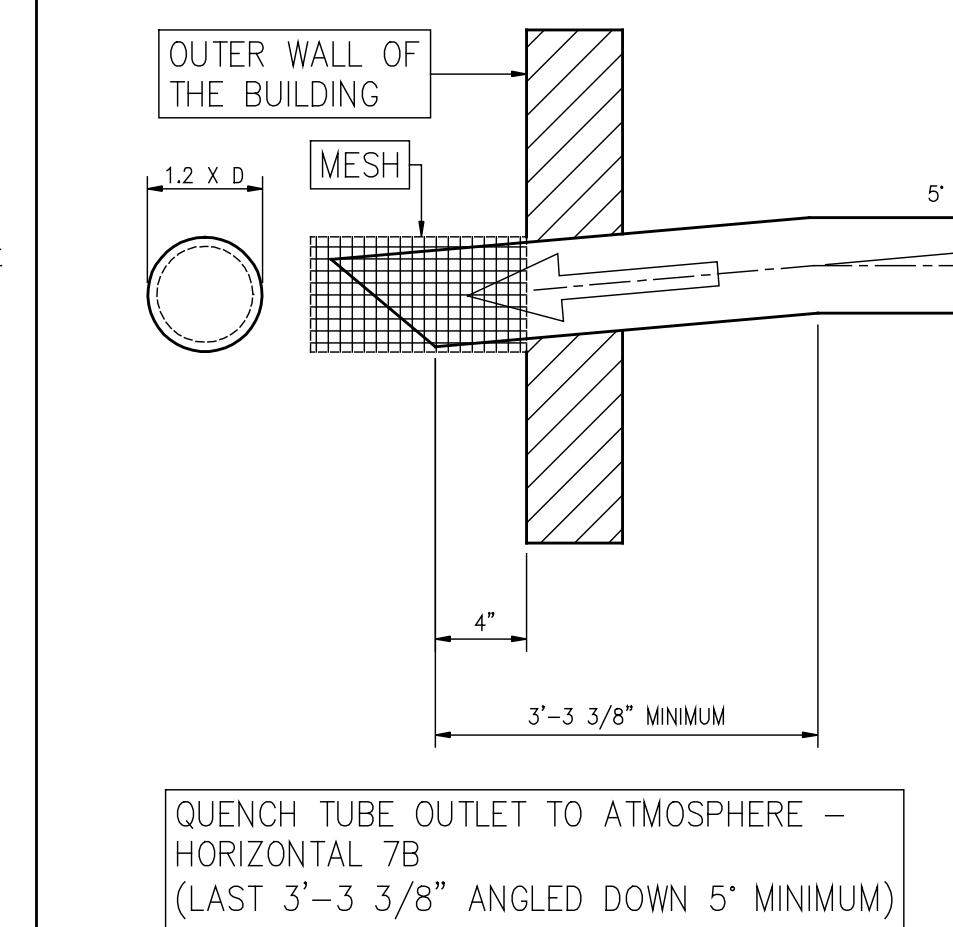
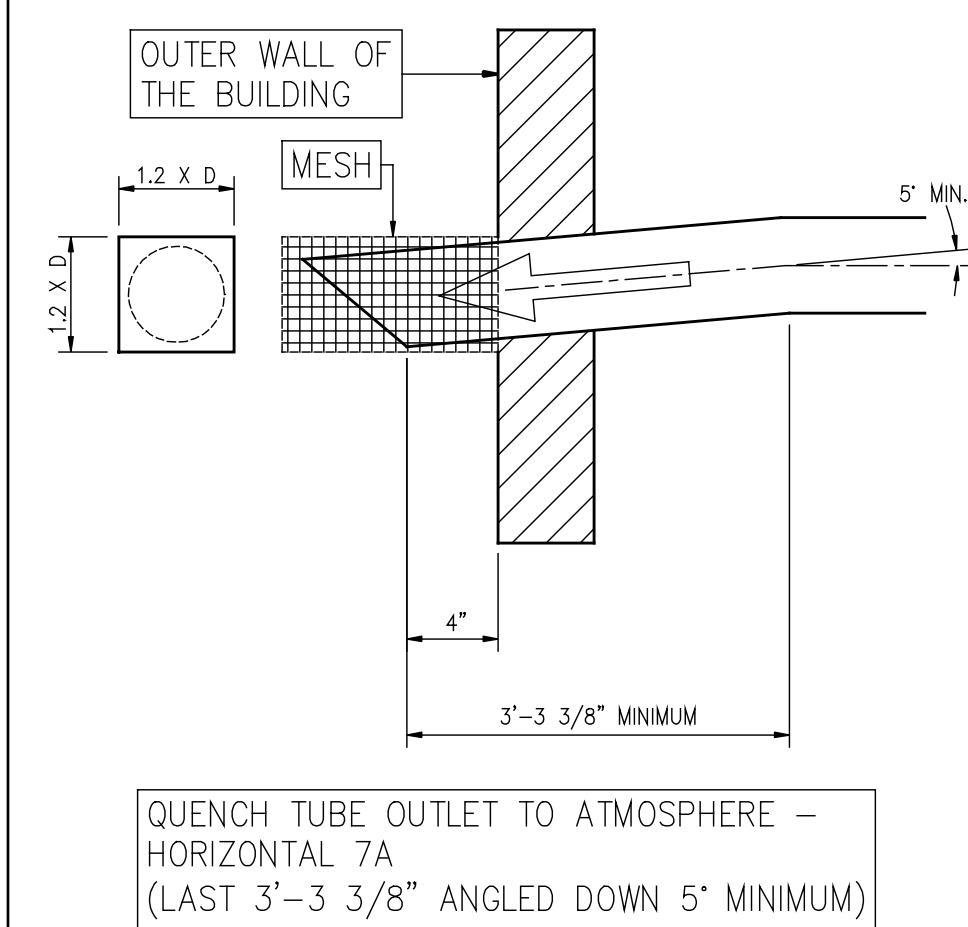
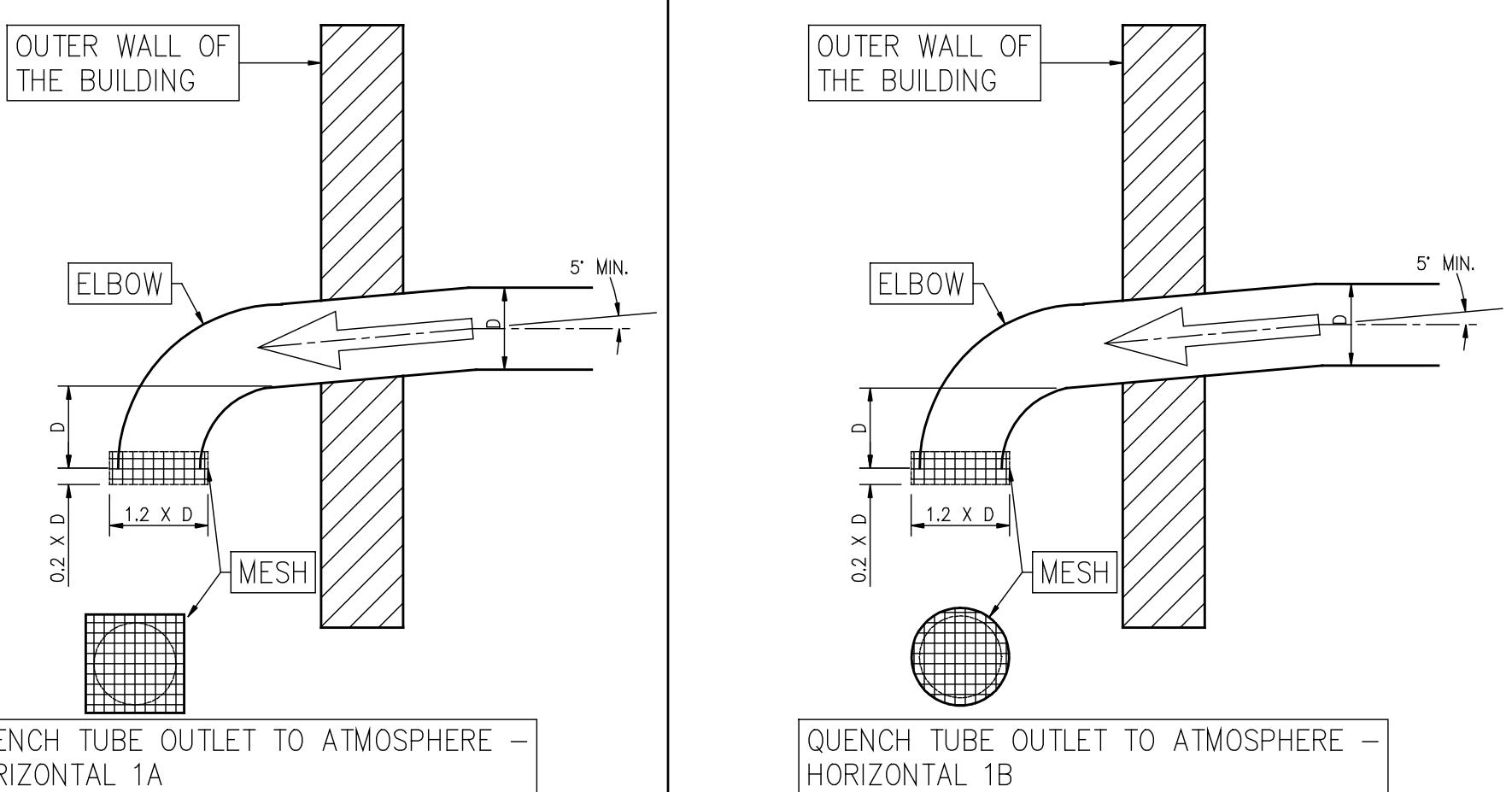
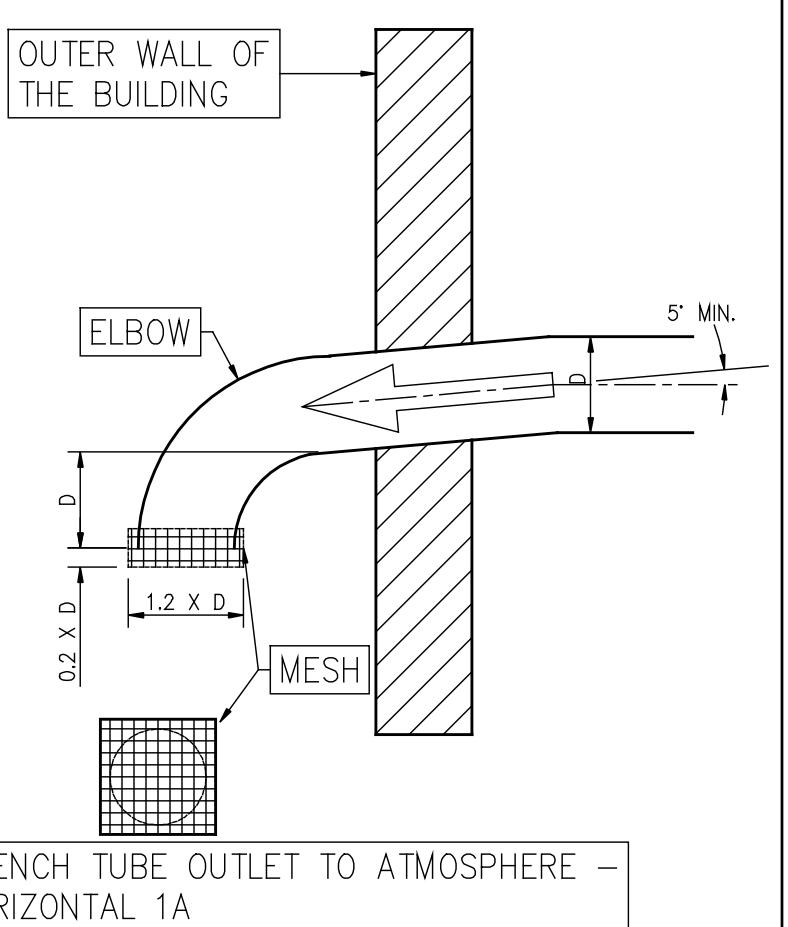
GASEOUS HELIUM ITSELF IS COLORLESS AND ODORLESS, NON-TOXIC, AND NONFLAMMABLE. HOWEVER, A LARGE AMOUNT OF GASEOUS HELIUM IS DISCHARGED AT VERY LOW TEMPERATURE, AND THEREFORE THE FOLLOWING POINTS MUST BE THOROUGHLY DISCHARGED WITH THE PERSON IN CHARGE OF MANAGEMENT OF THE HOSPITAL BUILDING TO DETERMINE THE PIPING DESIGN. PROTECTION MATERIAL (EX. PLYWOOD, BRICK, OR ANY MATERIAL WHICH CAN PREVENT DAMAGE TO BUILDING) IS HIGHLY RECOMMENDED TO PROTECT ANY PORTION OF BUILDING EXPOSED TO THE QUENCHING GASEOUS HELIUM.

FOR EXAMPLE, THE CRYOGENIC GASES ARE DISCHARGED AS SHOWN BELOW. REFER TO THIS EXAMPLE WHEN DESIGNING THE VENT.



**GENERAL**

- A. IN CASE YOUR EXISTING EXHAUST DOES NOT FULFILL THE DIMENSIONAL REQUIREMENTS, IT MUST BE CHANGE/MODIFIED TO ONE OF THE EXAMPLES.
- B. IN CASE THE EXHAUST MUST BE CHANGED, TAKE SPECIAL CARE OF THE PROPER MESH TO BE USED (THE MESH SIZE IS TO BE 3/8", WITH 18 GAUGE ROUNDWIRES AND THE MESH AREA AS DESCRIBED ABOVE).
- C. DO NOT INSTALL A MESH INSIDE THE QUENCH TUBE (REASON - IN CASE OF A QUENCH, THE MESH INSIDE THE QUENCH TUBE COULD BLOCK THE EXHAUST).
- D. TO AVOID THE RISK OF INJURY FROM COLD BURNS, IT IS RECOMMENDED THAT ACCESS TO THE QUENCH VENT MUST BE RESTRICTED TO WITHIN MINIMUM 19'-9" OF THE EXTERNAL EXIT. IF THE HEIGHT OF THE EXTERNAL QUENCH PIPE IS LESS THAN 19'-9" (EXAMPLE #2), THEN IT IS CUSTOMER'S RESPONSIBILITY TO DESIGN AND ENCLOSED A RESTRICTED ACCESS AREA WITH FENCE, CHAIN, ETC. IN ADDITION, APPLY THE CAUTION PLATE.
- E. **THE GASEOUS HELIUM IS VERY HAZARDOUS.** THEREFORE, THE GASEOUS HELIUM MUST BE CONDUCTED AND DISCHARGED TO AN OPEN SPACE WITH NO BUILDINGS, PASSAGE, WINDOWS, PARKING LOT, PRIVATE HOUSE, BASEMENT, EAVES, DRY AREA OR TRAFFIC NEARBY.
- F. IT IS DESIRABLE THAT THE END OF THE CHIMNEY PIPE BE HIGHER THAN THE TOP OF THE BUILDING. ERECT CHIMNEY PIPING WHENEVER POSSIBLE.
- G. LOUVER OF THE PIPE SHOULD FACE UPWARD OR USE UPWARD DEFLECTING PLATE.
- H. PLEASE CONSULT WITH TOSHIBA REPRESENTATIVE FOR MORE DETAILS.
- J. STAINLESS STEEL MESH NEEDED.
- K. **DANGER OF ANOXIA AND CRYOGENIC BURNS.** IF A LARGE AMOUNT OF CRYOGENIC GASEOUS HELIUM IS DISCHARGED AT ONE TIME, THE OXYGEN CONCENTRATION IN THE AREA DROPS TEMPORARILY (DURING GAS DISCHARGE), CREATING A RISK OF ANOXIA. IN ADDITION, IF A PERSON IS EXPOSED DIRECTLY OR INDIRECTLY TO THE DISCHARGED GAS, CRYOGENIC BURNS MAY RESULT.



**PLAN VIEW**

QUENCH TUBE OUTLET TO ATMOSPHERE -  
HORIZONTAL 6

**SIDE VIEW**

QUENCH TUBE OUTLET TO ATMOSPHERE -  
VERTICAL 4

**TYPICAL DRAWING**

(MRI SCAN ROOM - VANTAGE/TITAN)

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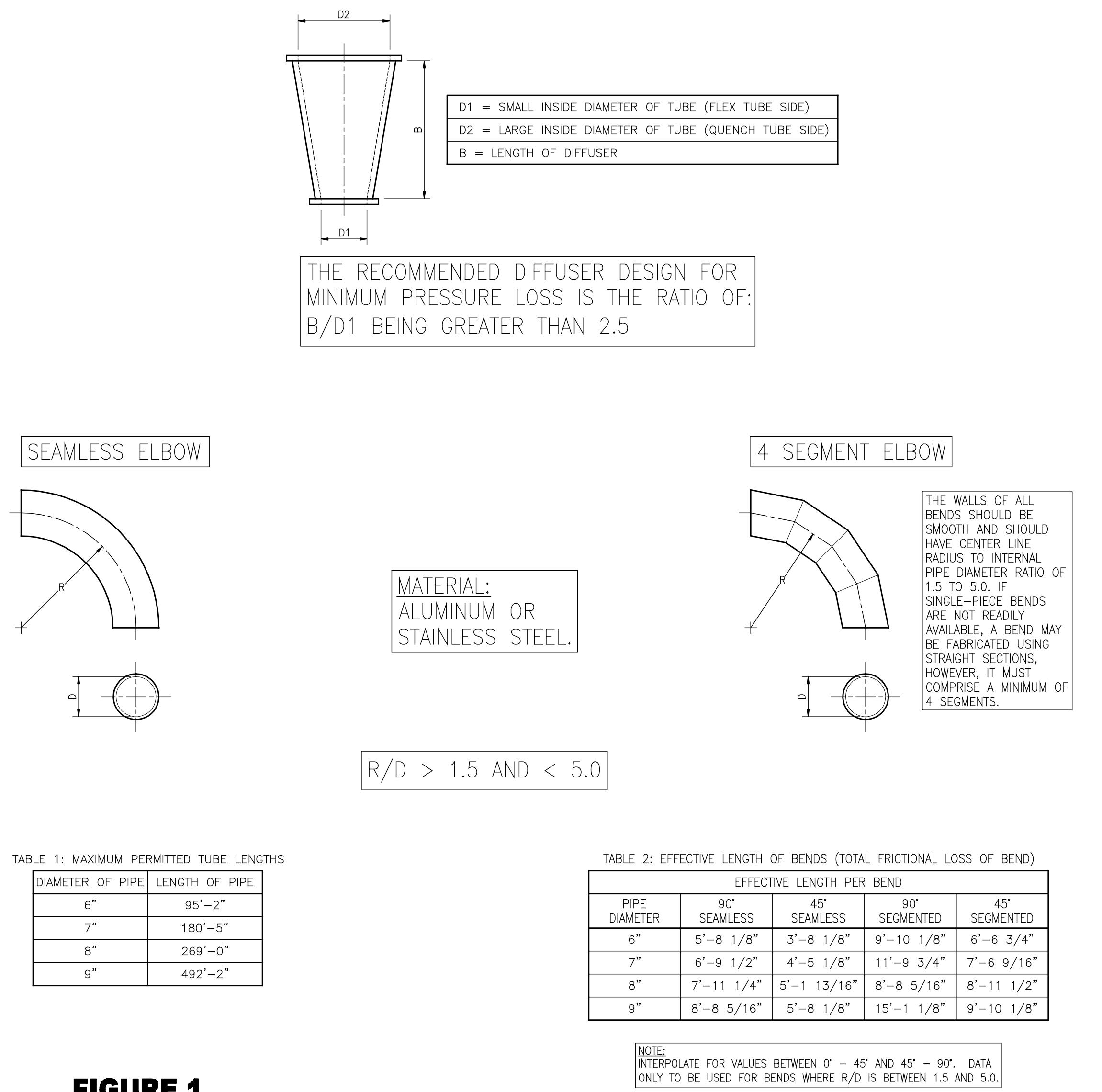
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DATE: 01-07-08  
SCALE: AS NOTED  
DRAWN: G.S.P.  
QUOTE: N/A  
PROJECT NO. **TYPICALS**

REVISED: 03-08-06

**M4**

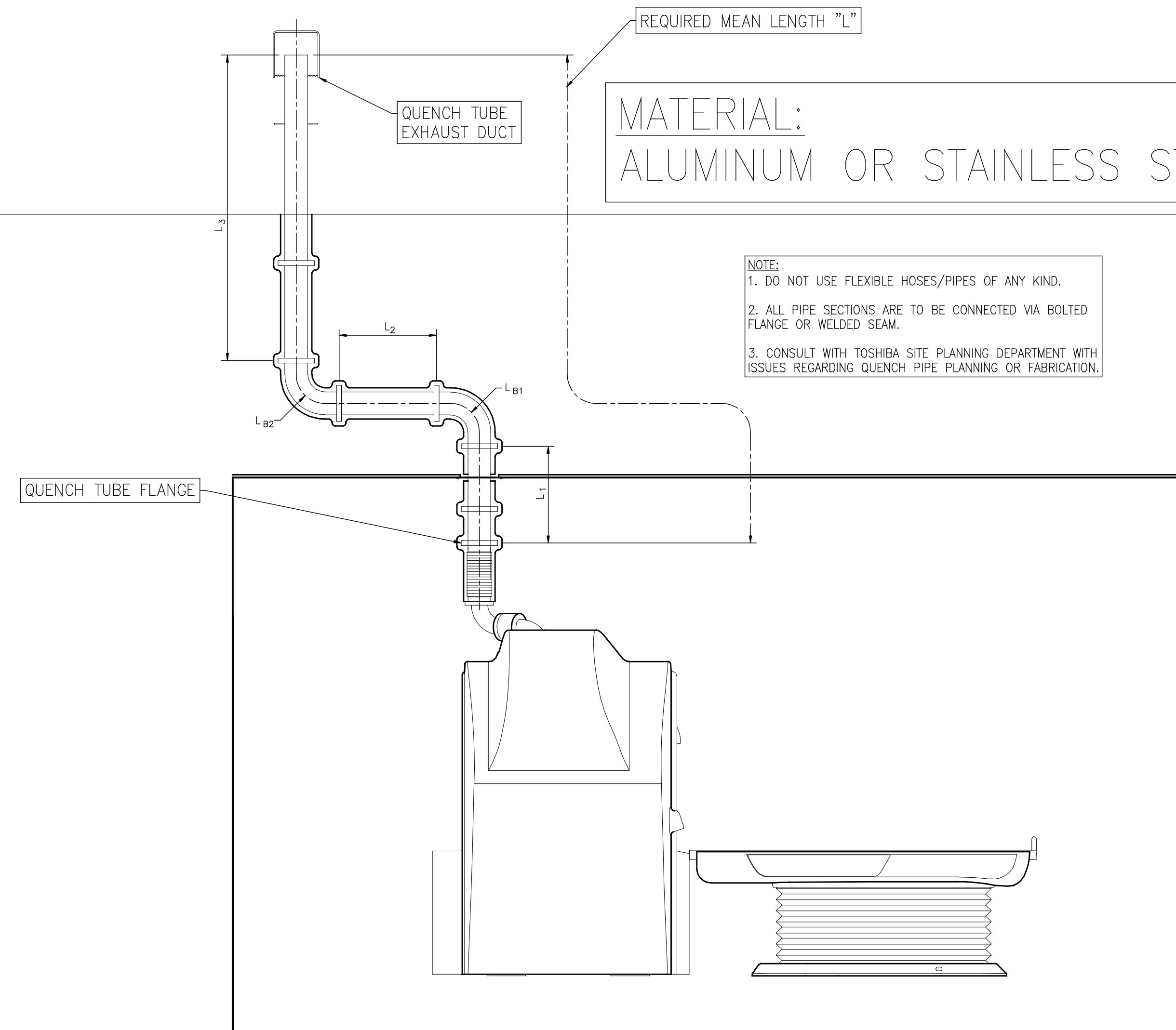


**FIGURE 1**

**GENERAL**

- A. THE THERMAL ENERGY DISSIPATED DURING A QUENCH CAUSES THE LIQUID HELIUM TO BOIL OFF RAPIDLY. THE SYSTEM MUST BE ABLE TO EXHAUST THE LARGE COLUMN OF GAS GENERATED AT THE APPROXIMATE EXPANSION RATIO OF 1:700 FROM LIQUID AT 4.2K TO ROOM TEMPERATURE GAS. THE EXHAUST SYSTEM IS CRITICAL TO THE SAFE OPERATION OF THE MAGNET AND THE GUIDELINES SET FORTH IN THIS SECTION MUST BE FOLLOWED.
- B. \* USE ONLY ALUMINUM OR STAINLESS STEEL MATERIAL FOR THE QUENCH TUBE. DO NOT USE ANY PLASTIC MATERIAL! PLASTIC MATERIAL WOULD BREAK INTO PIECES DURING A QUENCH OR REFILLING THE MAGNET! DO NOT USE FLEXIBLE HOSES/PIPES OF ANY KIND. THEY WILL NOT HOLD THE PRESSURE DURING A QUENCH!
- C. \* PREVENT THE QUENCH TUBE FROM COLLECTING WATER OR MOISTURE INSIDE THE TUBE. THERE MUST NOT BE ANY POSSIBILITY OF FLOODING THE QUENCH TUBE WITH WATER OR MOISTURE.
- D. IT IS DIFFICULT TO CALCULATE THE DROP IN PRESSURE ALONG THE QUENCH TUBE DURING A QUENCH BECAUSE OF THE COMPRESSIBILITY OF THE GAS. THIS IS FURTHER COMPLICATED BY THE NONLINEAR HEAT INPUTS ALONG THE LENGTH OF THE TUBE AND THE EFFECT ON THE GAS DENSITY PROFILE.
- E. THE RESULT OF THE COMPUTED LOSS IN PRESSURE DIFFERS FROM THAT OBTAINED BY EXPERIMENT. FOR THIS REASON, THE CALCULATIONS NEEDED TO SIZE THE QUENCH TUBE BY DETERMINING THE THEORETICAL DROP IN PRESSURE ARE NO LONGER PERFORMED.
- F. INSTEAD, THE SIZING PROCEDURE IS BASED ON TABULATED DATA WHICH IS USED IN SIMPLE ARITHMETIC CALCULATIONS. THE TABLES ARE BASED ON EMPIRICAL DATA DERIVED FROM QUENCH TEST PRESSURE LOSS MEASUREMENT (REQUIRED AS PART OF THE REGULATORY APPROVAL PROCESS).
- COMPONENTS OF THE QUENCH TUBE**

  - THE FOLLOWING SPECIFIC DESIGN RULES APPLY TO THE COMPONENTS MAKING UP THE QUENCH TUBE:
  - G. THE QUENCH TUBE COMPRISSES STRAIGHT TUBE SECTIONS, BENDS (UP TO 90 DEGREES) AND A DIFFUSER, IF REQUIRED. THE END OF THE TUBE HAS TO BE CLOSED WITH A PROTECTIVE RAIN GUARD.
  - H. THERMAL CONTRACTIONS HAVE TO BE FACTORED IN. IN ADDITION, THE WEIGHT OF THE TUBE SHOULD BE SUPPORTED AGAINST EXTERNAL FORCES. THE LOAD OF THE TUBE OR THE CORRESPONDING SUPPORT CONSTRUCTION SHOULD NOT BE SUPPORTED BY THE QUENCH VALVE.
  - J. APPROPRIATE CRYOGENIC SEALS MUST BE USED BETWEEN ALL JOINT FACES.
  - K. THE END OF THE QUENCH TUBE MUST BE PROTECTED FROM THE OUTSIDE ELEMENTS, E.G. RAIN, SNOW, OR OBJECTS WHICH COULD ENTER AND CAUSE BLOCKAGE. THIS PROTECTION WOULD BE IN THE FORM OF A MESH WITH A FREE DIAMETER DOUBLE THAT OF THE QUENCH TUBE.
  - L. WHERE THE QUENCH TUBE EXITS THROUGH A FLAT ROOF, THE OUTLET MUST BE ABOVE A LEVEL WHERE WATER COULD ENTER IN THE EVENT THAT THE ROOF DRAINS BECOME BLOCKED. IN THE CASE OF A HORIZONTAL EXIT THROUGH A WALL, THE OUTLET SHOULD BE ANGLED DOWNWARD SLIGHTLY TO HELP PREVENT RAIN INGRESS. THE ANGLE SHOULD BE AT LEAST 5° FOR THE LAST 3'-3 3/8" OF THE TUBE.
  - M. WHERE THE QUENCH TUBE EXITS VERTICALLY, A RAIN COVER MUST ALSO BE FITTED. THE MESH FREE DIAMETER SHOULD BE FOUR TIMES THE DIAMETER AREA OF THE QUENCH TUBE. THE CLEARANCE BETWEEN RAIN GUARD AND THE MESH SHOULD EQUAL THE RADIUS OF THE TUBE. A SUITABLE DEFLECTOR PLATE SHOULD BE WELDED TO THE TUBE WHERE IT EXITS THE ROOF TO PREVENT HELIUM FROM REENTRANT THE SUITE. THE DEFLECTOR PLATE SHOULD BE THE SAME DIAMETER AS THE RAIN GUARD. IT SHOULD BE SITED AT LEAST TWO PIPE DIAMETERS ABOVE THE ROOF AND TWO DIAMETERS BELOW THE BOTTOM OF THE RAIN GUARD.
  - N. TO AVOID THE RISK OF INJURY FROM COLD BURNS, ACCESS TO THE QUENCH VENT MUST BE RESTRICTED TO WITHIN 19'-9" OF THE EXTERNAL EXIT. THE WALLS OF ALL BENDS SHOULD BE SMOOTH AND SHOULD HAVE CENTER LINE RADIUS TO INTERNAL PIPE DIAMETER RATIO OF 1.5 TO 5.0. IF SINGLE-PIECE BENDS ARE NOT READILY AVAILABLE, A BEND MAY BE FABRICATED USING STRAIGHT SECTIONS, HOWEVER, IT MUST COMPRISES A MINIMUM OF 4 SEGMENTS.
  - O. MITERED ELBOWS MUST NEVER BE USED.
  - P. EXPANSIONS FROM A SMALL TO LARGE TUBE DIAMETER ARE ACCOMPLISHED VIA A DIFFUSER.
  - Q. THERMALLY INSULATING THE QUENCH LINE WILL HELP TO PREVENT COLD BURNS DURING A QUENCH. A PRODUCT SUCH AS ARMAFLEX IS IDEAL.
  - R. ALL STRAIGHT TUBE SECTIONS SHOULD BE HYDRAULICALLY SMOOTH.
  - S. IF A LOCALLY PURCHASED DUCT IS USED, USE A STAINLESS STEEL DUCT WITH WELDED JOINTS. BE SURE TO USE FLANGES AT JOINT SECTIONS. A SLIP-ON JOINT MUST NOT BE USED BECAUSE IT MIGHT BE DISCONNECTED WHEN THE PIPE CONTRACTS DUE TO CRYOGENIC TEMPERATURES IN CASE OF QUENCHING. FOR THE PIPING OUTSIDE THE BUILDING, DUCTS WITH WELDED JOINTS MUST BE USED AND THE PIPING MUST BE DESIGNED SO THAT NO GAS LEAKAGE WILL OCCUR.



REFER TO TABLES 1 & 2 FOR EFFECTIVE LENGTHS

DEFINITIONS					
$L$	MEAN LENGTH OF QUENCH TUBE REQUIRED				
$L_A$	APPARENT LENGTH OF QUENCH TUBE REQUIRED				
$L_S$	TOTAL LENGTH OF STRAIGHT SECTIONS IN THE TUBE				
$L_1, \dots, L_N$	STRAIGHT SECTIONS				
$L_{B1}, \dots, L_{BN}$	APPARENT LENGTH PER BEND				

FORMULAS					
$L_S = L_1 + L_2 + L_3 + L_4 + \dots + L_N$					
$L_A = L_S + L_{B1} + L_{B2} + L_{B3} + \dots + L_{BN}$					

STAINLESS STEEL			ALUMINUM		
NOMINAL DIAMETER	OUTSIDE DIAMETER	PIPE THICKNESS	NOMINAL DIAMETER	OUTSIDE DIAMETER	PIPE THICKNESS
7 7/8"	8 1/2"	7/64"	7 7/8"	8 1/2"	25/128"
9 27/32"	10 17/32"	17/128"	9 27/32"	10 17/32"	25/128"
11 13/16"	12 69/128"	5/32"	11 13/16"	12 69/128"	25/128"
13 25/32"	14"	5/32"	13 25/32"	14"	15/64"
15 191/256"	16"	45/256"	15 191/256"	16"	15/64"

**SIZING PROCEDURE**

THE SIZING PROCEDURE FOR THE QUENCH TUBE SHOULD FOLLOW THE STEPS OUTLINED BELOW. PAY PARTICULAR ATTENTION OF THE SPECIAL NOTE IN "6" REGARDING THE USE OF A TUBE COMPRISING OF TWO DIFFERENT DIAMETER PIPE.

- DETERMINE THE MEAN LENGTH OF TUBE REQUIRED TO REACH FROM THE QUENCH VALVE OUTLET TO THE END OF THE QUENCH TUBE WHERE IT EXITS TO THE ATMOSPHERE. THE MEAN LENGTH REFERS TO THE CENTER LINE LENGTH INCLUSIVE OF ALL BENDS. A NOMINAL CENTER LINE RADIUS FOR BENDS WOULD BE ASSUMED AT THIS STAGE.
- THE LENGTH OF THE LINE DETERMINED IN NOTE "A" IS TERMED THE "MEAN ABSOLUTE LENGTH ( $L$ )". IN TERMS OF THE PRESSURE LOSS ALONG THE TUBE DURING A QUENCH, THE APPARENT LENGTH OF THE TUBE IS LONGER DUE TO THE EXTRA FRICTIONAL LOSSES AROUND THE BENDS. FOR THIS REASON, THE APPARENT LENGTH ( $L_A$ ) IS CALCULATED AS  $L_A = L_S + L_{B1} + L_{B2} + \dots$  WHERE  $L_{B1,2}$  ARE THE BEND LOSS LENGTHS AND  $L_S$  = THE TOTAL LENGTH OF THE STRAIGHT SECTIONS. SELECT THE DIAMETER OF THE TUBE REQUIRED BASED UPON THE MEAN ABSOLUTE LENGTH ( $L$ ) FROM TABLE 1. TO DETERMINE  $L_A$ , ADD ALL BEND LOSS LENGTHS FOR THE CORRESPONDING DIAMETER IN TABLE 2 TO THE SUM OF THE STRAIGHT LINES.
- IF  $L_A$  IS LESS THAN THE PERMITTED LENGTH IN TABLE 1, NO FURTHER ACTION IS NECESSARY AND THE DIAMETER SELECTED MAY BE USED. IF  $L_A$  EXCEEDS THE PERMITTED LENGTH, SELECT THE NEXT GREATER PIPE DIAMETER AND REPEAT STEPS 2 AND 3.
- DETERMINE THE SIZE REQUIRED FOR THE PROTECTIVE RAIN GUARD.
- DETERMINE THE CORRECT LENGTH FOR A DIFFUSER, IF REQUIRED.
- IF IT IS NECESSARY TO USE A SMALLER DIAMETER PIPE FOR THE FIRST FEW METERS OF A LONG QUENCH TUBE, THE REMAINING LENGTH OF TUBE MUST BE COMPLETED USING A PIPE WITH A DIAMETER AT LEAST FOUR TIMES THAT OF THE SMALLER PIPE. IN ADDITION, THE TOTAL LENGTH FOR THE QUENCH TUBE MUST NOT EXCEED THE MAXIMUM RECOMMENDED LENGTH FOR THE LARGER TUBE INDICATED IN TABLE 1.

REVISED: 11-29-07

**TYPICAL DRAWING**

(MRI SCAN ROOM - VANTAGE/TITAN)

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DATE: 01-07-08

SCALE: AS NOTED

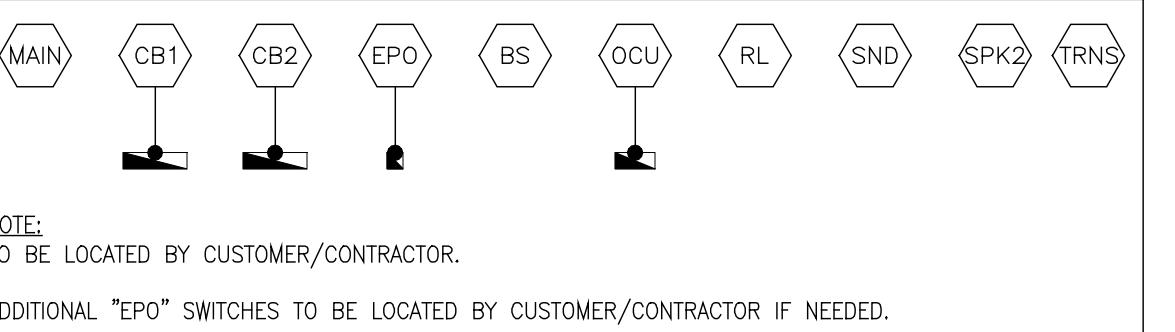
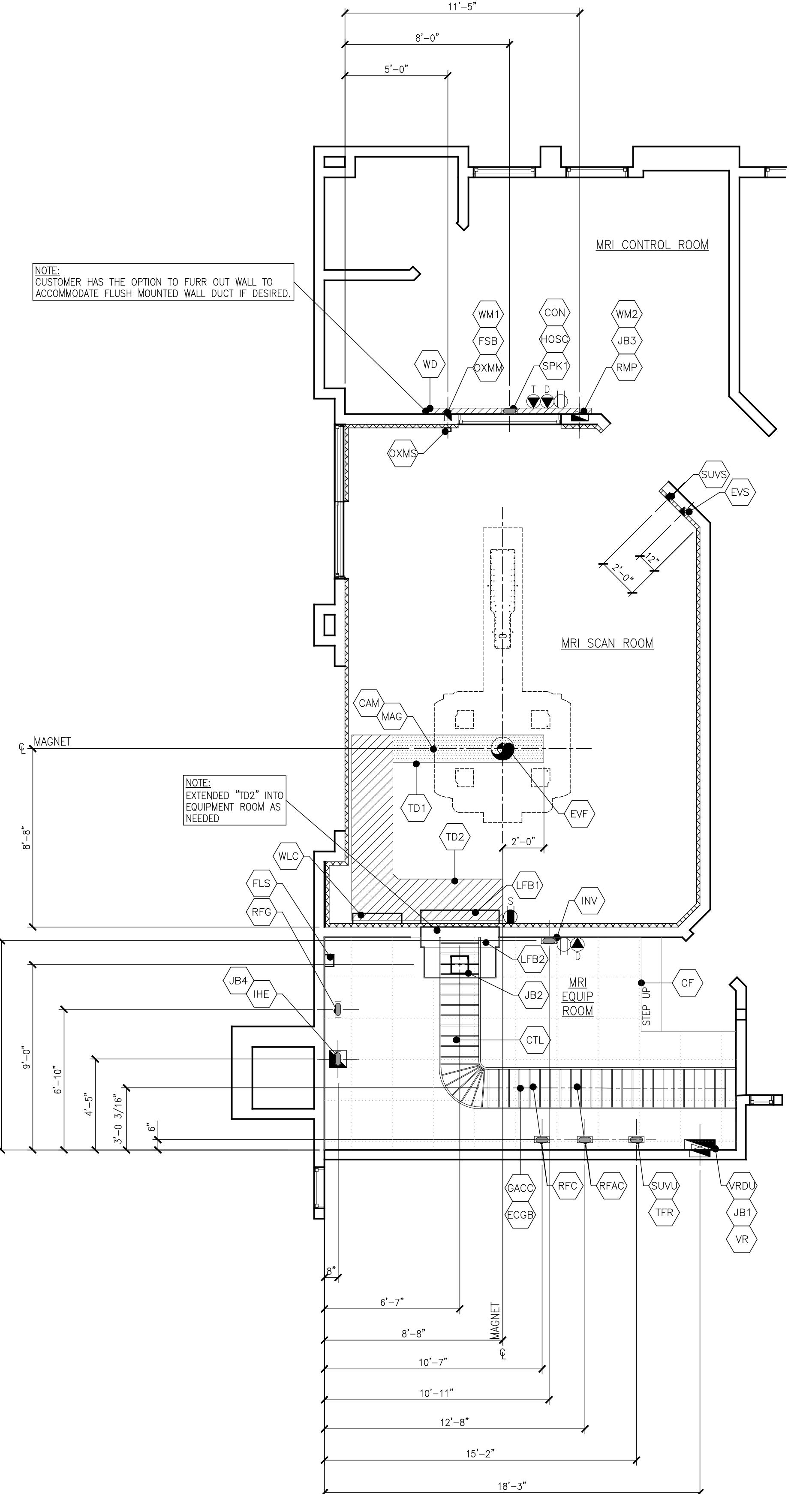
DRAWN: G.S.P.

QUOTE: N/A

PROJECT NO.

**TYPICALS**

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### ELECTRICAL DUCT LEGEND

ITEM	ITEM DESCRIPTION SUPPLIED / INSTALLED BY CUSTOMER / CONTRACTOR	REF.
WD	10" W X 3 1/2" D, FLUSH/SURFACE MOUNTED WALL DUCT W/(3) EQUALLY PARTITIONED COMPARTMENTS THROUGHOUT & REMOVABLE ACCESS COVERS. MOUNTED 12" A.F.F. TO BOTTOM OF DUCT.	2 E5
VR	10" W X 3 1/2" D, SURFACE MOUNTED RISER DUCT W/(3) EQUALLY PARTITIONED COMPARTMENTS THROUGHOUT & REMOVABLE ACCESS COVERS. FROM "PCDU" TO BELOW COMPUTER FLOORING.	1 E5
CTL	18" W X 4" H, CABLE TRAY LADDER. LOCATION TO BE DETERMINED. WORKING LOAD OF CABLE TRAY LADDER IS 100 LBS/LINEAR FOOT.	3 E5
TD1	16" W X 8" D ALUMINUM DUCT, FLUSH MOUNTED (W/ COVERS) IN FINISHED FLOOR. (3) EQUALLY PARTITIONED COMPARTMENTS & REMOVABLE ACCESS ALUMINUM COVERS (THICKNESS SHOULD BE ABLE TO SUPPORT MIN. OF 200 LBS.) ARE REQUIRED.	6 E5
TD2	16" W X 8" D ALUMINUM DUCT, FLUSH MOUNTED (W/ COVERS) IN FINISHED FLOOR. (3) EQUALLY PARTITIONED COMPARTMENTS & REMOVABLE ACCESS ALUMINUM COVERS (THICKNESS SHOULD BE ABLE TO SUPPORT MIN. OF 200 LBS.) ARE REQUIRED.	6 E5
WM1	G-3000 (2 3/4" X 1 17/32") WIREMOLD, SURFACE MOUNTED ON WALL CONNECTED TO WALL DUCT "WD".	
WM2	G-3000 (2 3/4" X 1 17/32") WIREMOLD, SURFACE MOUNTED ON WALL CONNECTING WALL DUCT "WD" TO "RMP".	
CF	24" W X 24" L COMPUTER FLOOR, 12" RAISED FLOOR MUST BE CAPABLE OF SUPPORTING ALL TOSHIBA EQUIPMENT. ALL CUT OUTS BY ELECTRICAL CONTRACTOR.	

### ELECTRICAL LEGEND

ITEM	ITEM DESCRIPTION SUPPLIED / INSTALLED BY CUSTOMER / CONTRACTOR	REF.
MAIN	MAIN SERVICE ENTRANCE PANEL	1 E4
CB1	THREE PHASE CIRCUIT BREAKER PER TOSHIBA POWER SPECIFICATIONS (SEE DETAIL) CIRCUIT BREAKER LOCATION PER CODE REQUIREMENTS BY ELECTRICAL CONTRACTOR.	2 E4
CB2	CUSTOMER/CONTRACTOR PROVIDED CIRCUIT BREAKER FOR ROOM LIGHTS, CIRCUIT BREAKER LOCATION TO BE DETERMINED BY ELECTRICAL CONTRACTOR.	
VRDU	18" W X 10" H X 6" D J-BOX, SURFACE MOUNTED 45 1/2" A.C.F. TO BOTTOM OF BOX. OPEN TO "VR".	
TRNS	STEP UP TRANSFORMER. EXACT SIZE OF J-BOX T.B.D.	
EPO	4" STD. J-BOX FOR REMOTE OFF SWITCH. LOCATED BY CUSTOMER/CONTRACTOR. DPDT, NORMALLY OPEN MUSHROOM HEAD PUSH BUTTON.	1 E4
BS	BUILDING STEEL.	1 E4
MAG	OPENING ON ALUMINUM FLOOR DUCT.	5 E5
CON		2 E5
HOSO	SHARED GROMMETED OPENING IN "WD".	1 E3
SPK1		1 E3
OXMM	WIRE CONNECTION THROUGH RF SHIELD FOR OXYGEN MONITOR IN CONTROL ROOM @ +5'-0" A.F.F. TO CENTER.	
OXMS	WIRE CONNECTION THROUGH RF SHIELD FOR OXYGEN SENSOR IN SCAN ROOM, (COPPER OR ALUMINUM) @ JUST BELOW FINISHED CEILING. A WAVE GUIDE IS REQUIRED, TO BE SUPPLIED BY RF PROVIDER.	
SUVS	4" W X 4" D X 4" H J-BOX FOR EMERGENCY RUN DOWN UNIT IN SCAN ROOM (PLASTIC OR ALUMINUM). FLUSH IN THE WALL AT +6'-0" A.F.F. TO CENTER OF BOX. ADJACENT TO SCAN ROOM DOOR.	
SUVU	MONTEED ON TOP OF "TFR".	
EVS	4" W X 4" H X 4" D J-BOX FOR EMERGENCY VENTILATION FAN SWITCH @ 4'-0" A.F.F. TO BOTTOM OF BOX.	
EVF	SCAN ROOM EMERGENCY VENTILATION FAN (FIELD VERIFY LOCATION).	
FSB	4" W X 4" H X 4" D J-BOX FOR FAN SWITCH BOX IN CONTROL ROOM (FIELD VERIFY LOCATION).	
CAM	PATIENT MONITOR CAMERA ON THE MAGNET.	
WLC	WALL CABINET SUPPLIED AND INSTALLED BY TOSHIBA (SHOWN FOR LOCATION ONLY).	5-7 M3
LFB1	LINE FILTER BOX SUPPLIED AND INSTALLED BY TOSHIBA (SCAN ROOM SIDE).	1-4 M3
LFB2	LINE FILTER BOX SUPPLIED AND INSTALLED BY TOSHIBA (EQUIPMENT ROOM SIDE).	1 P2
FLS	FLOW SWITCH SUPPLIED BY TOSHIBA AND INSTALLED BY CUSTOMER/CONTRACTOR.	2 E3
TFR	GROMMETED OPENING W/NON-CHAFING MATERIAL IN RAISED COMPUTER FLOOR TILE.	2 E3
RFG	GROMMETED OPENING W/NON-CHAFING MATERIAL IN RAISED COMPUTER FLOOR TILE.	2 E3
GACC	CABLES WILL DRAPE FROM THE CABLE TRAY LADDER "CTL" TO THE TOP OF CABINET.	2 E3
ECGB	MONTEED ON TOP OF "GACC".	2 E3
RFC	GROMMETED OPENING W/NON-CHAFING MATERIAL IN RAISED COMPUTER FLOOR TILE. SOME CABLES WILL DRAPE FROM CABLE TRAY LADDER "CTL" TO TOP OF CABINET.	2 E3
RFAC	GROMMETED OPENING W/NON-CHAFING MATERIAL IN RAISED COMPUTER FLOOR TILE. SOME CABLES WILL DRAPE FROM CABLE TRAY LADDER "CTL" TO TOP OF CABINET.	2 E3
IHE	GROMMETED OPENING W/NON-CHAFING MATERIAL IN RAISED COMPUTER FLOOR TILE.	2 E3
OCU	10" W X 10" H X 4" D, J-BOX FOR OUTDOOR CHILLER UNIT.	1 E5
RMP	GROMMETED OPENING AT END OF "WM2". HEIGHT TO BE DETERMINED.	1 E5
INV	GROMMETED OPENING W/NON-CHAFING MATERIAL IN RAISED COMPUTER FLOOR TILE.	1 E5
JB1	10" W X 10" H X 4" D, J-BOX FLUSH W/FINISHED WALL, MOUNTED 45 1/2" A.C.F. TO BOTTOM OF BOX. OPEN TO "VRDU".	1 E5
JB2	10" W X 10" L X 4" H, J-BOX FLUSH MOUNTED IN FINISHED CEILING.	1 E5
JB3	10" W X 10" H X 4" D, J-BOX FLUSH W/FINISHED WALL, MOUNTED 12" A.F.F. TO BOTTOM OF BOX. OPEN TO "WD".	3 E5
JB4	10" W X 10" L X 4" H, J-BOX SURFACE MOUNTED UNDER COMPUTER FLOORING TO FINISHED SLAB.	3 E5
RL	ROOM LIGHTING (BY CUSTOMER/CONTRACTOR).	
SPK2	SCAN ROOM SPEAKER.	
SND	SOUND SYSTEM (OPTIONAL).	
OUTLET	ELECTRICAL OUTLETS.	
CONNECTOR	RJ45 CONNECTOR, CAT5 CABLE TO BE USED FOR DATA CONNECTION FOR NETWORKING.	
PHONE	DEDICATED PHONE LINE SUPPLIED/INSTALLED BY CUSTOMER/CONTRACTOR.	
OUTLET	CUSTOMER/CONTRACTOR PROVIDED SERVICE ELECTRICAL OUTLETS THAT CONNECTS TO "LFB1".	

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### TYPICAL DRAWING

(MRI) SCAN ROOM – VANTAGE/TITAN)

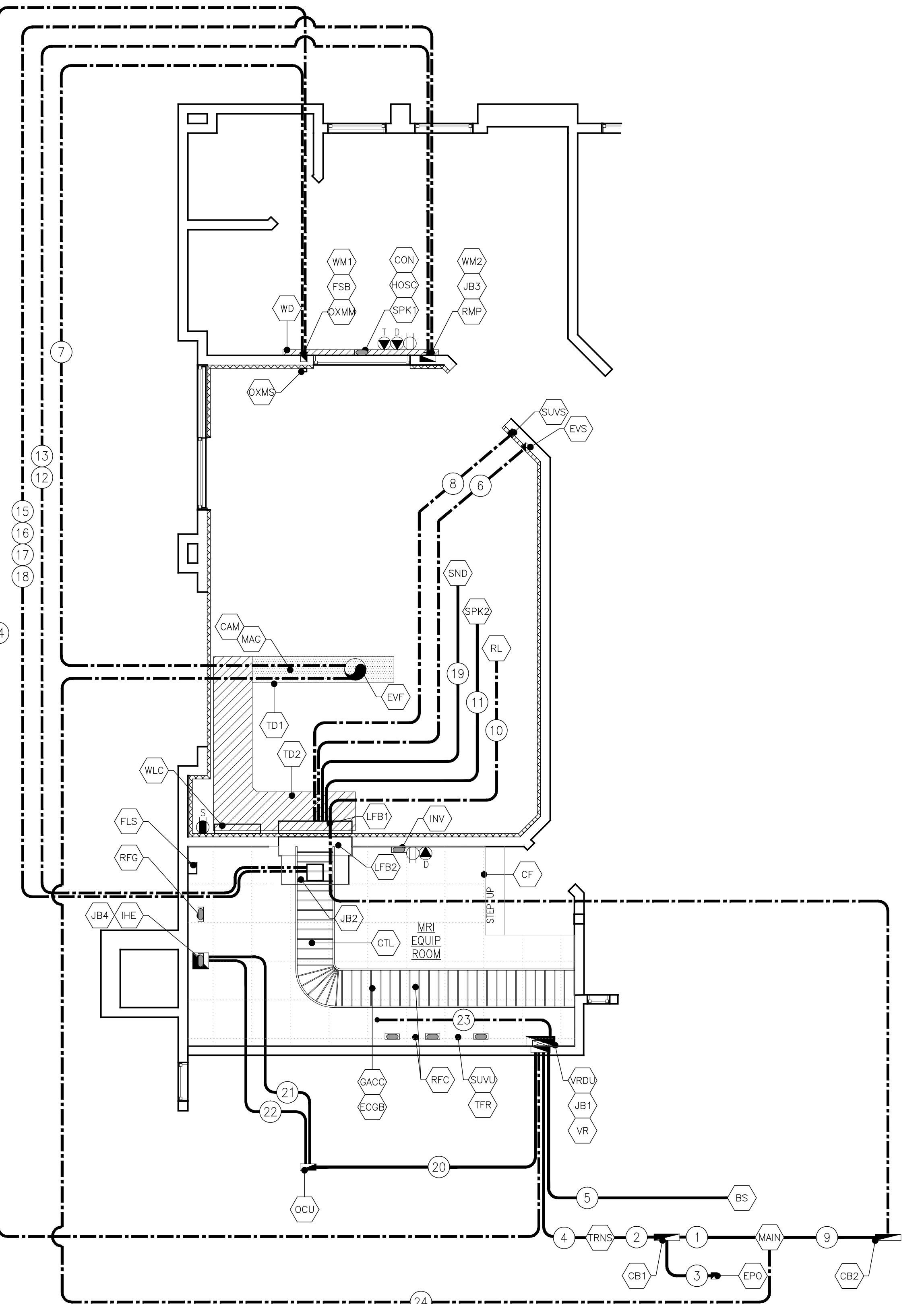
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DATE: 01-07-08  
SCALE: 1/4" = 1'-0"  
DRAWN: G.S.P.  
QUOTE: N/A  
PROJECT NO. TYPICALS  
E1



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## CONDUIT SCHEDULE

NOTE: ALL MATERIAL IN SCAN ROOM MUST BE NON FERROUS.  
NOTE: ALL CONDUIT RUNS MUST TAKE THE SHORTEST MOST DIRECT ROUTE POSSIBLE.

REVISED: 05-01-06

RUN (NUMBER)	CONDUIT (POINT TO POINT)	CONDUIT (DIAMETER/IN.)	CABLE (POINT TO POINT)	CABLE LENGTH (MAX. USABLE)	CABLES (SUPPLIED BY)
1	MAIN	CB1	SEE DETAIL 2 E4	SEE DETAIL 2 E4	CONTRACTOR
2	CB1	TRNS	SEE DETAIL 2 E4	SEE DETAIL 2 E4	CONTRACTOR
3	CB1	EPO	SEE DETAIL 2 E4	SEE DETAIL 2 E4	CONTRACTOR
4	TRNS	JB1	SEE DETAIL 2 E4	SEE DETAIL 2 E4	CONTRACTOR
5	JB1	BS	PER CODE	PER CODE	CONTRACTOR
6	LFB1	EVS	1"	AS REQ'D	CONTRACTOR (IN RF SHIELD)
7	FSB	EVF	1"	32'-0"	TOSHIBA (THRU RELAY BOX)
8	LFB1	SUVS	1"	49'-2 1/2"	TOSHIBA (IN RF SHIELD)
9	MAIN	CB2	PER CODE	PER CODE	CONTRACTOR
10	CB2	RL	*	AS REQ'D	CONTRACTOR (IN RF SHIELD)
11	LFB1	SPK2	1/2"	65'-0"	TOSHIBA (IN RF SHIELD)
12	JB2	JB3	3" (COMBINED)	65'-0"	TOSHIBA
13	JB2	JB3	3" (COMBINED)	65'-0"	TOSHIBA (POWER CABLE) (MAY COMBINE WITH #11&12)
14	JB1	FSB	PER CODE	32'-0"	TOSHIBA
15	JB2	JB3	3" (COMBINED)	65'-0"	TOSHIBA
16	JB2	JB3	3" (COMBINED)	65'-0"	TOSHIBA (SIGNAL CABLE)
17	JB2	JB3	1/2"	65'-0"	TOSHIBA
18	JB2	JB3	3/4"	PER MFG.	CONTRACTOR (VIA #21)
19	LFB1	SND	1/2"	PER MFG.	CONTRACTOR
20	JB1	OCU	PER CODE	PER CODE	CONTRACTOR
21	OCU	JB4	3/4"	PER SITE	CONTRACTOR (POWER CABLE)
22	OCU	JB4	3/4"	PER SITE	CONTRACTOR (SIGNAL CABLE)
23	VRDU	GACC	2 1/2"	32'-0"	TOSHIBA
24	MAIN	EVF	PER MFG.	PER MFG.	CONTRACTOR

### CONDUITS SUPPLIED / INSTALLED BY CUSTOMER / CONTRACTOR

REVISED: 04-19-07

## TYPICAL DRAWING

(MRI) SCAN ROOM – VANTAGE/TITAN)

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DATE: 01-07-08

SCALE: 1/4" = 1'-0"

DRAWN: G.S.P.

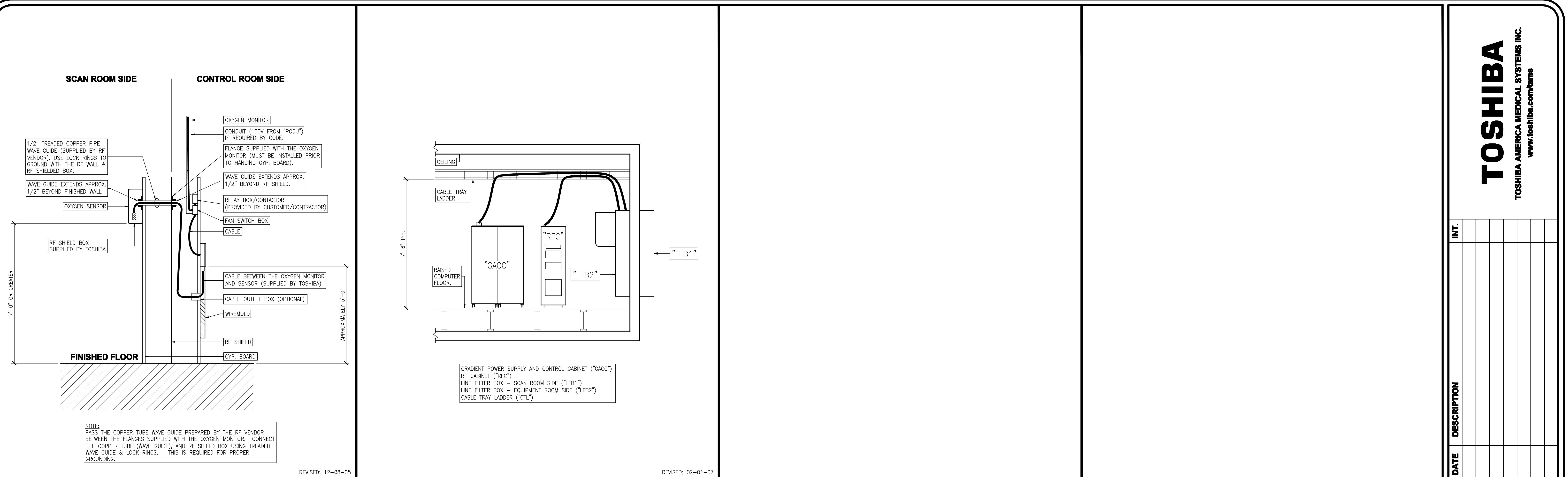
QUOTE: N/A

PROJECT NO.

**TYPICALS**

**E2**

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# **1 CONNECTION OF "OXMM" & "OXMS"**

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SCALE: NOT TO SCALE

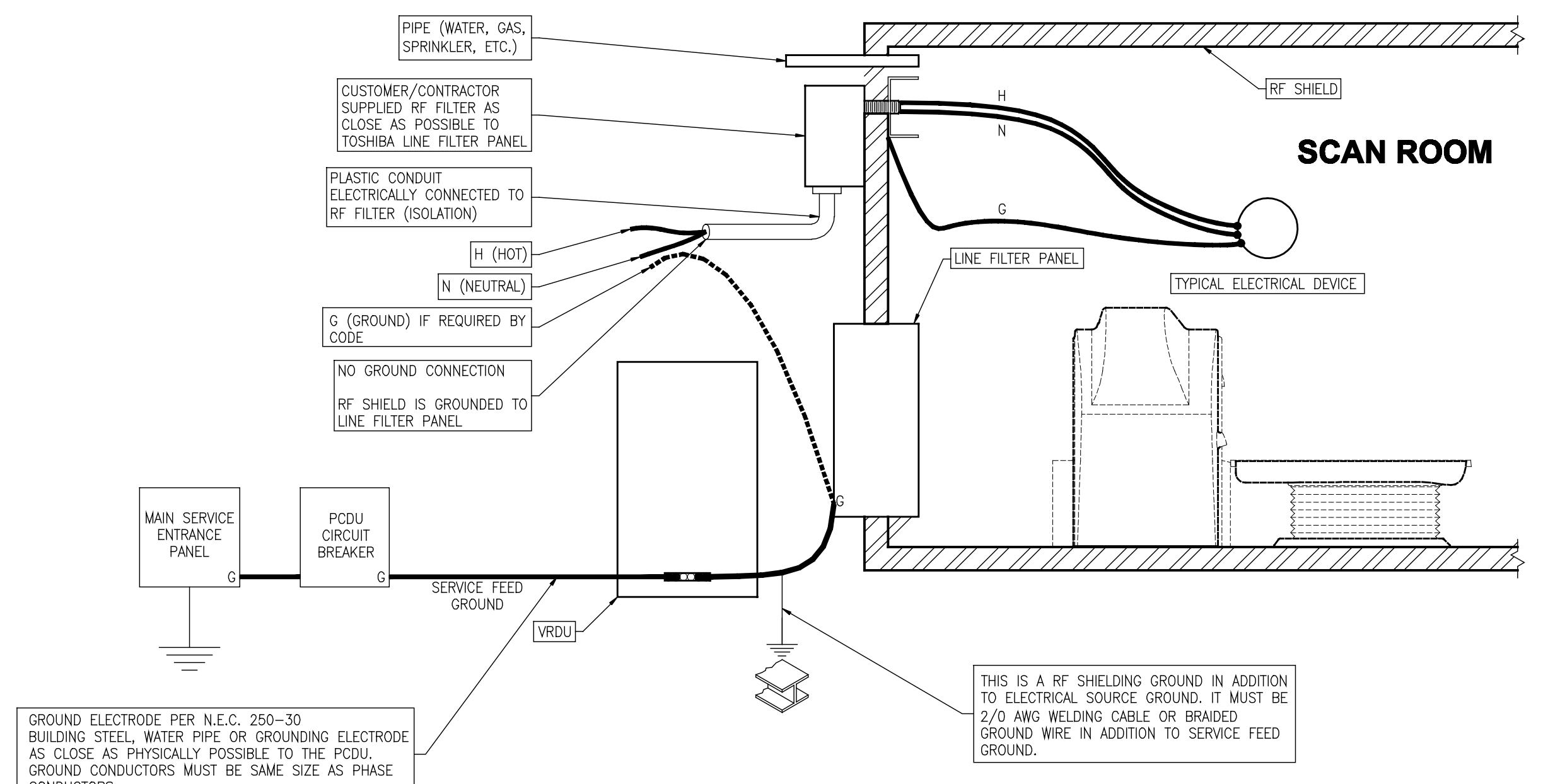
# **TYPICAL CABLE LADDER ELEVATION**

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SCALE: NOT TO SCALE

REVISED: 02-01-07

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REVISED: 12-19-07

## **4 SCAN ROOM GROUNDING TYPICAL DETAIL**

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SCALE: NOT TO SCALE

E3

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ATE: 01-07-08

SCALE: **1/4" = 1'-0"**

BAWN: GSP

NOTE: N/A

PROJECT NO.

## TYPICALS

100

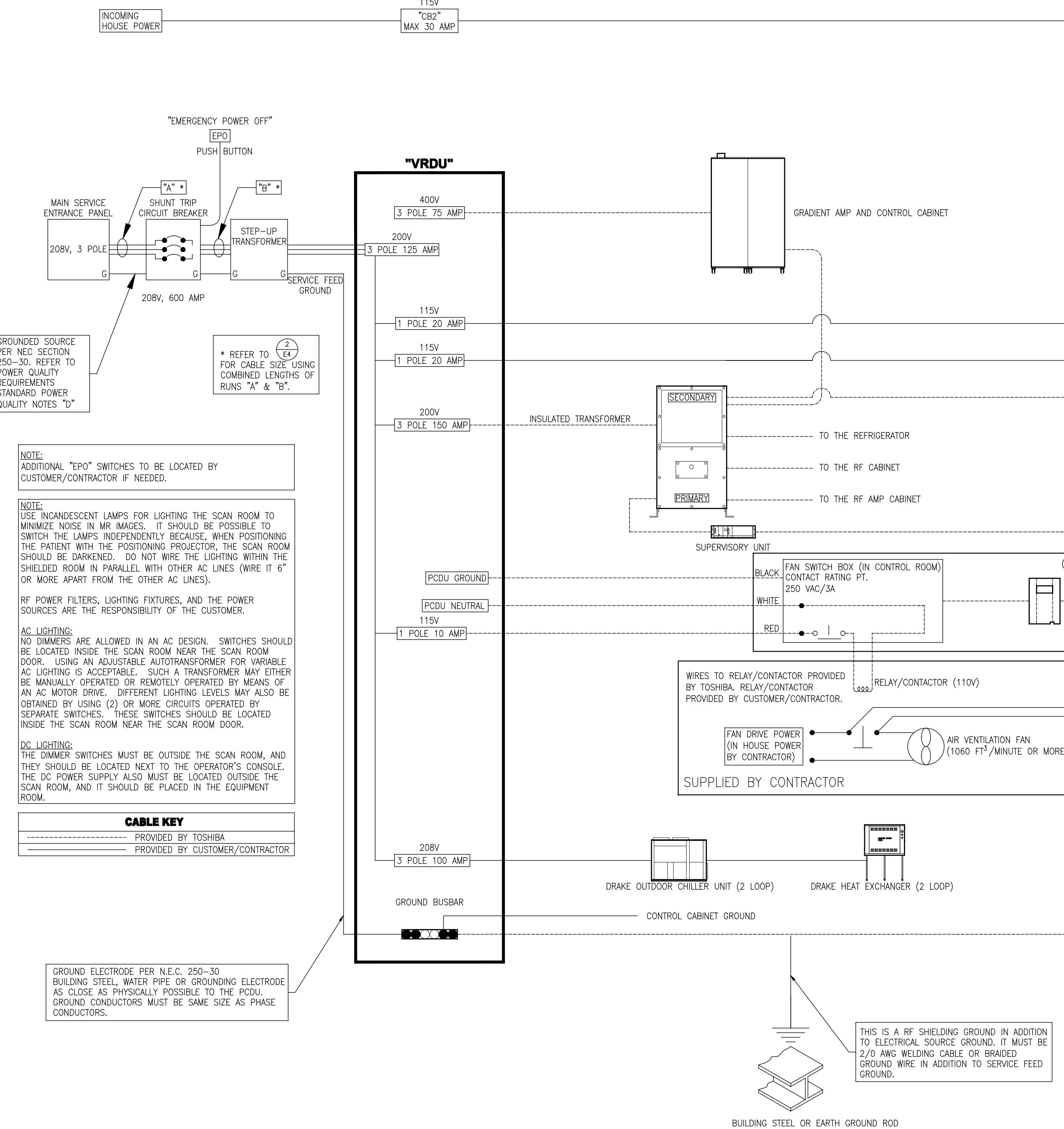
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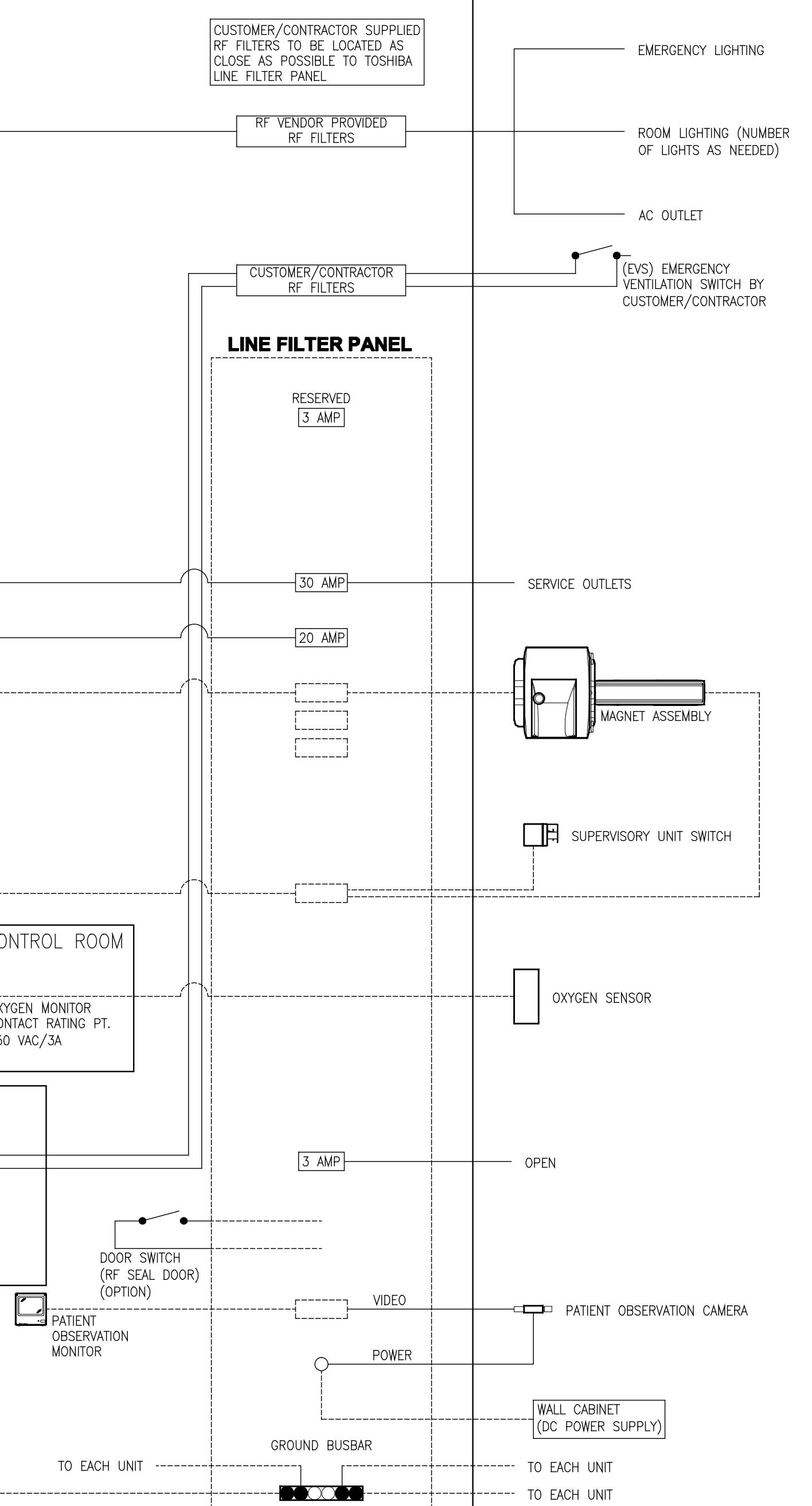
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## EQUIPMENT ROOM SIDE      SCAN ROOM SIDE



## EQUIPMENT ROOM SIDE      SCAN ROOM SIDE

### POWER QUALITY REQUIREMENTS TITAN SCANNER WITH STEP-UP TRANSFORMER & VRDU

SUPPLY CONFIGURATION: 3 PHASE, 3 WIRE POWER, AND GROUND DELTA OR WYE  
NOMINAL LINE VOLTAGE: 208V  
LINE VOLTAGE VARIATION: ±10% STEADY-STATE INCLUDING SAGS AND SURGES  
LINE VOLTAGE BALANCE: 2% MAXIMUM OF NOMINAL VOLTAGE BETWEEN PHASES  
FREQUENCY VARIATION: ±1 Hz  
HARMONIC DISTORTION: 3% STEADY STATE, 5% FOR SHORT PERIODS (1 MINUTE OR LESS)  
GROUND CONDUCTOR IMPEDANCE: 0.1 Ohms @ 60Hz, TO NEUTRAL-GROUND BONDING POINT (SEE NOTE D)  
MAXIMUM SYSTEM DEMAND: 120kVA (IMAGING)

### RECOMMENDED CONDUCTOR SIZES (HOUSE MAIN POWER TO TRANSFORMER) (SEE NOTE E) FOR 1.5% IMPEDANCE OF BRANCH CONDUCTORS (20°C)

CONDUCTOR SIZE	208V (SEE NOTE B)
500 MCM 2 X 400 MCM 2 X 500 MCM	189 FT. 236 FT.

CIRCUIT BREAKER SIZE: (SEE NOTE F)	600 A
MOMENTARY MAXIMUM CURRENT:	388.60 A
MAXIMUM PH-PH IMPEDANCE:	0.005 Ohms
MAXIMUM VOLTAGE DROP:	7.9V

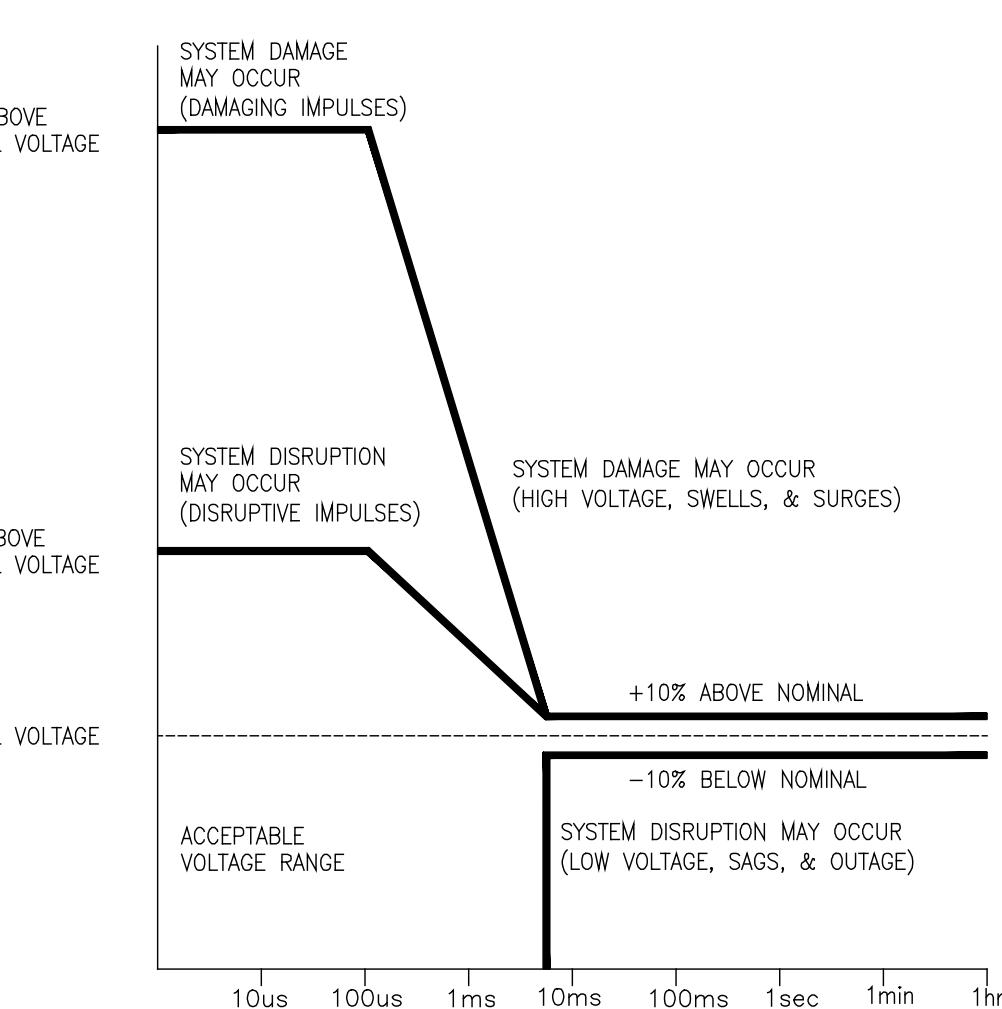
### RECOMMENDED CONDUCTOR SIZES (TRANSFORMER TO VRDU) (SEE NOTE E) FOR 1.5% IMPEDANCE OF BRANCH CONDUCTORS (20°C)

CONDUCTOR SIZE	208V (SEE NOTE B)
4/0 AWG	266 FT.
250 MCM	312 FT.
300 MCM	374 FT.
350 MCM	437 FT.
400 MCM	504 FT.
500 MCM	629 FT.
600 MCM	748 FT.
700 MCM	862 FT.

CIRCUIT BREAKER SIZE: (SEE NOTE F)	225 A
MOMENTARY MAXIMUM CURRENT:	168.39 A
MAXIMUM PH-PH IMPEDANCE:	0.029 Ohms
MAXIMUM VOLTAGE DROP:	18.2V

### STANDARD POWER QUALITY NOTES

- A. A GROUNDED NEUTRAL POWER SOURCE IS REQUIRED TO ASSURE RELIABLE EQUIPMENT OPERATION. THE NEUTRAL CONDUCTOR MAY NOT BE USED FOR A PARTICULAR SYSTEM. FLOATING OR DELTA SOURCES ARE NOT ACCEPTABLE.
- B. IN CASES WHERE MULTIPLE VOLTAGES ARE PERMITTED, THE PREFERRED SYSTEM VOLTAGE IS SPECIFIED.
- C. DUE TO THE HIGH INSTANTANEOUS POWER OF MEDICAL IMAGING SYSTEMS, USE THE HIGHEST AVAILABLE VOLTAGE SOURCE. ENSURE THAT LOWER VOLTAGE SOURCES ARE DERIVED DIRECTLY FROM THE SERVICE ENTRANCE OF THE FACILITY.
- D. GROUND CONDUCTORS MUST BE THE SAME SIZE AS THE PHASE CONDUCTORS UNLESS OTHERWISE STATED.
- E. ALL FEEDER AND BRANCH CIRCUIT CONDUCTORS MUST BE COPPER - ALUMINUM IS NOT PERMITTED.
- F. IF THE EQUIPMENT CIRCUIT BREAKER IS NOT LOCATED IN THE CONTROL AREA, A SHUNT TRIP BREAKER MUST BE USED IN ORDER TO COMPLY WITH N.E.C. 517-72(b). A PUSH-BUTTON TO OPERATE THE SHUNT TRIP MUST BE LOCATED IN THE CONTROL AREA.
- G. A SEPARATE CIRCUIT, FED FROM THE FACILITY RADIOLOGY PANEL OR A MAIN SERVICE PANEL IS REQUIRED. USE OF A SUB PANEL WITH LOADS SUCH AS ELEVATORS, HVAC, MOTORS, ETC., IS NOT PERMITTED.
- H. DEVICES SUCH AS UNINTERRUPTIBLE POWER SUPPLIES, POWER CONDITIONERS, VOLTAGE REGULATORS, AND FILTERS MAY BE INCOMPATIBLE WITH THIS IMAGING EQUIPMENT. CONSULT YOUR TOSHIBA SERVICE REPRESENTATIVE PRIOR TO PURCHASING OR INSTALLING THESE DEVICES.



REVISED: 09-11-07

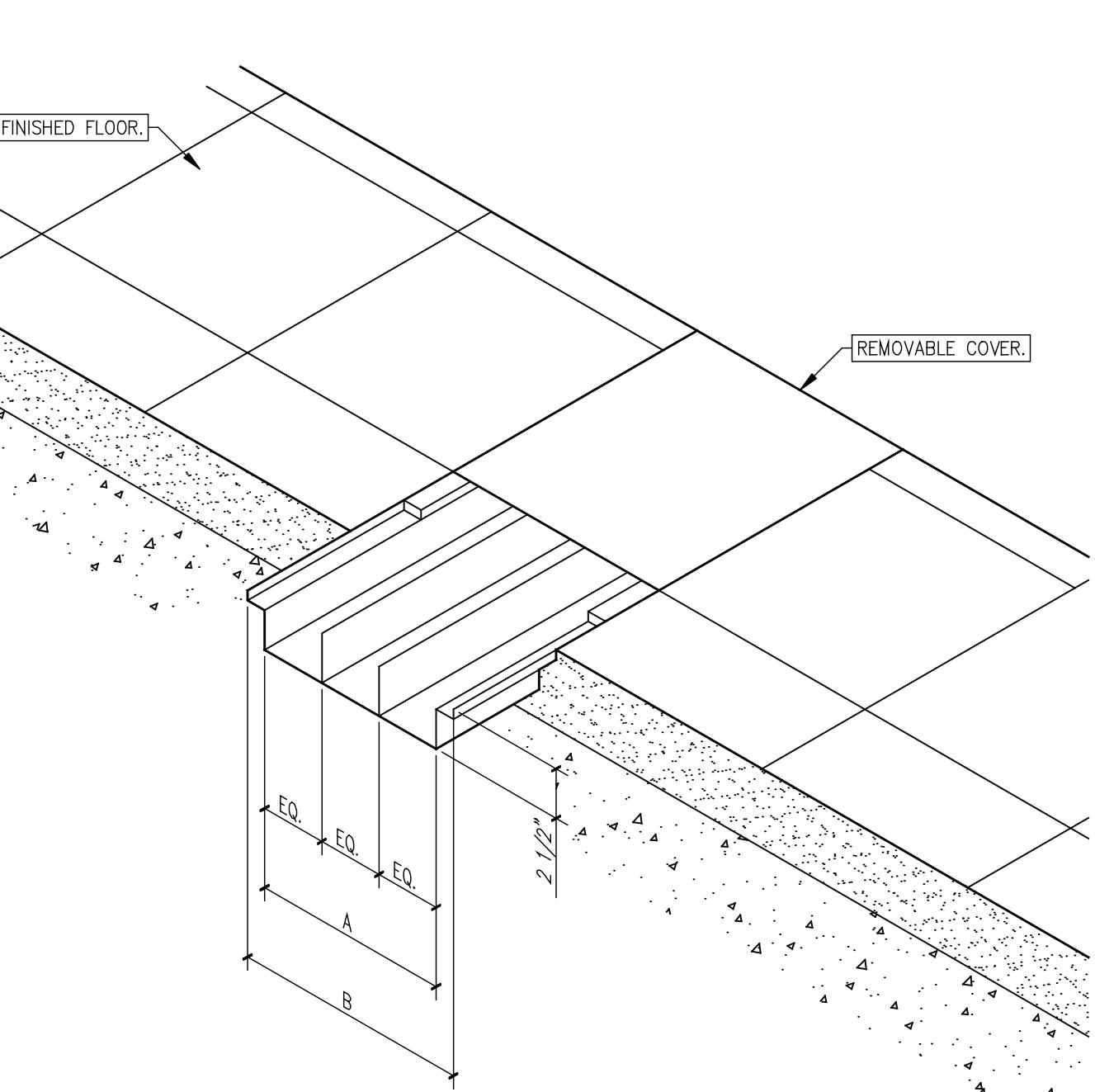
REVISED: 3-24-2004

### 1 TYPICAL PCDU J-BOX WI CONDUIT J-BOX

SCALE: NOT TO SCALE

REVISED: 11-30-06

10" TRENCH DUCT:	A = 10"
18" TRENCH DUCT:	B = 18"
A = 16"	
D = 20"	
24" TRENCH DUCT:	A = 24"
B = 26"	
30" TRENCH DUCT:	A = 30"
B = 32"	



### 5 TYPICAL FLUSH MOUNTED TRENCH DUCT

SCALE: NOT TO SCALE

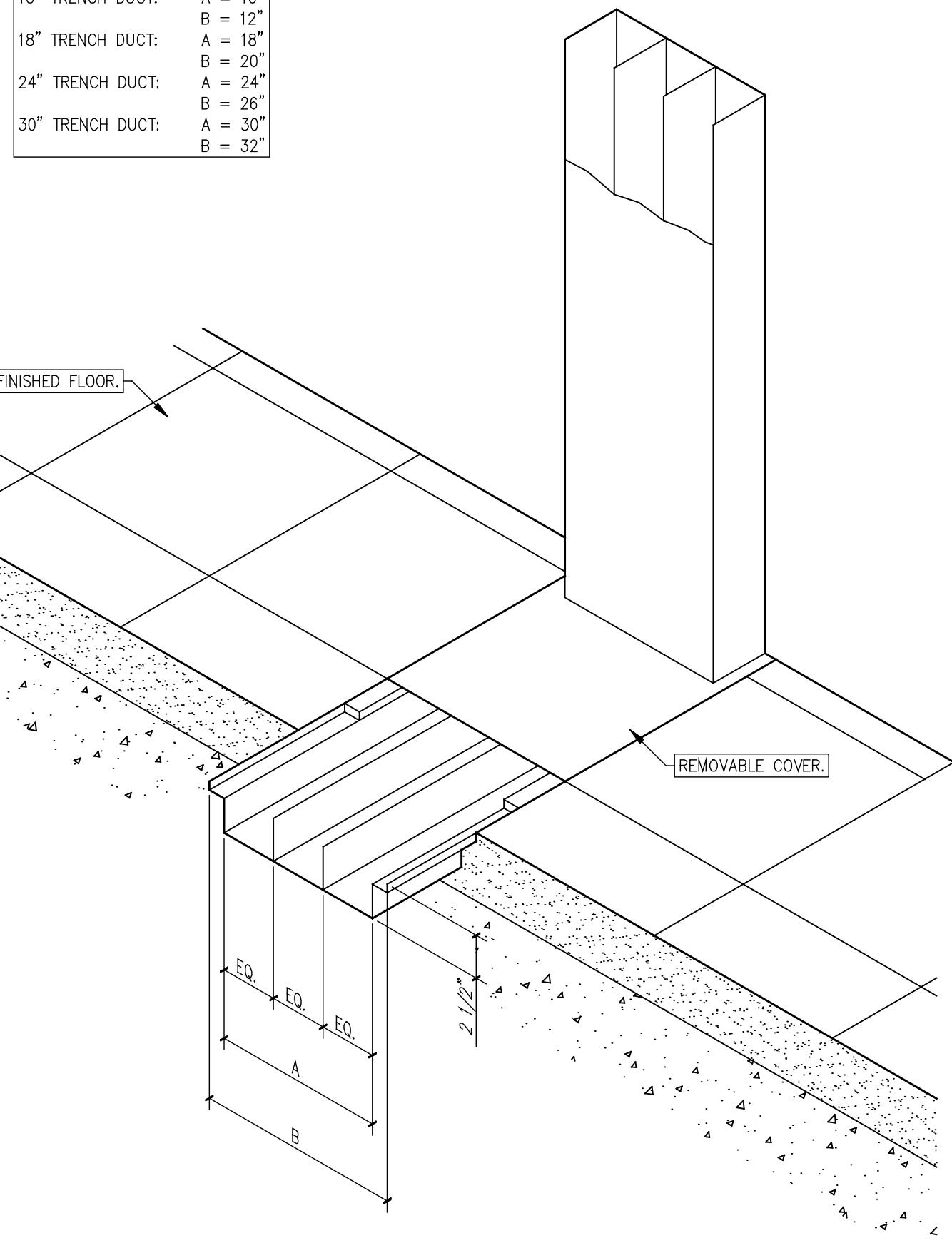
REVISED: 11-30-06

### 2 TYPICAL WALL DUCT

SCALE: NOT TO SCALE

REVISED: 11-30-06

10" TRENCH DUCT:	A = 10"
18" TRENCH DUCT:	B = 18"
A = 16"	
D = 20"	
24" TRENCH DUCT:	A = 24"
B = 26"	
30" TRENCH DUCT:	A = 30"
B = 32"	



### 6 TYPICAL FLUSH MOUNTED TRENCH DUCT WI "VR"

SCALE: NOT TO SCALE

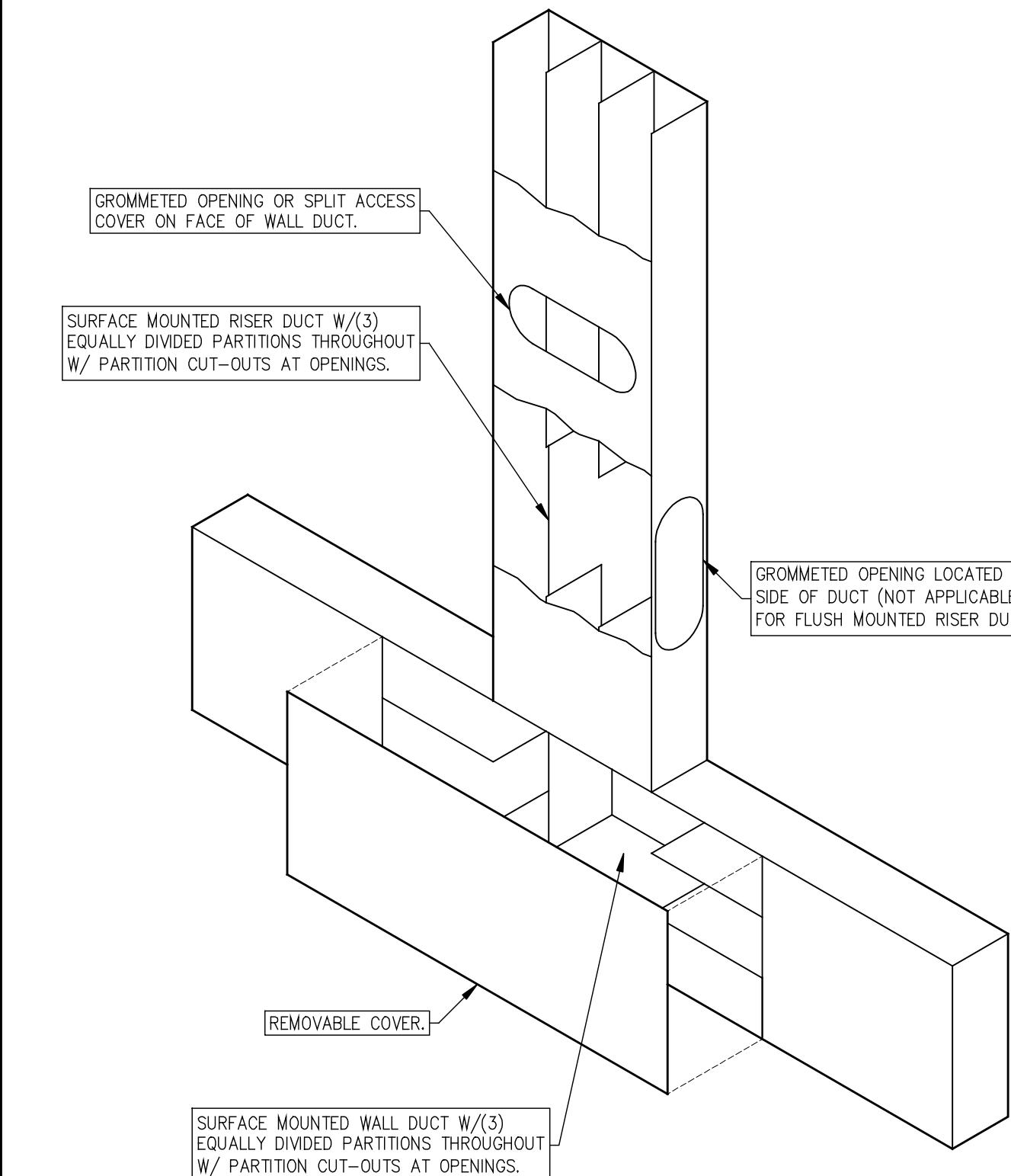
REVISED: 11-30-06

### 3 TYPICAL WALL DUCT WITH J-BOX

SCALE: NOT TO SCALE

REVISED: 11-30-06

10" TRENCH DUCT:	A = 10"
18" TRENCH DUCT:	B = 18"
A = 16"	
D = 20"	
24" TRENCH DUCT:	A = 24"
B = 26"	
30" TRENCH DUCT:	A = 30"
B = 32"	



### 7 TYPICAL WALL DUCT WI VERTICAL RISER

SCALE: NOT TO SCALE

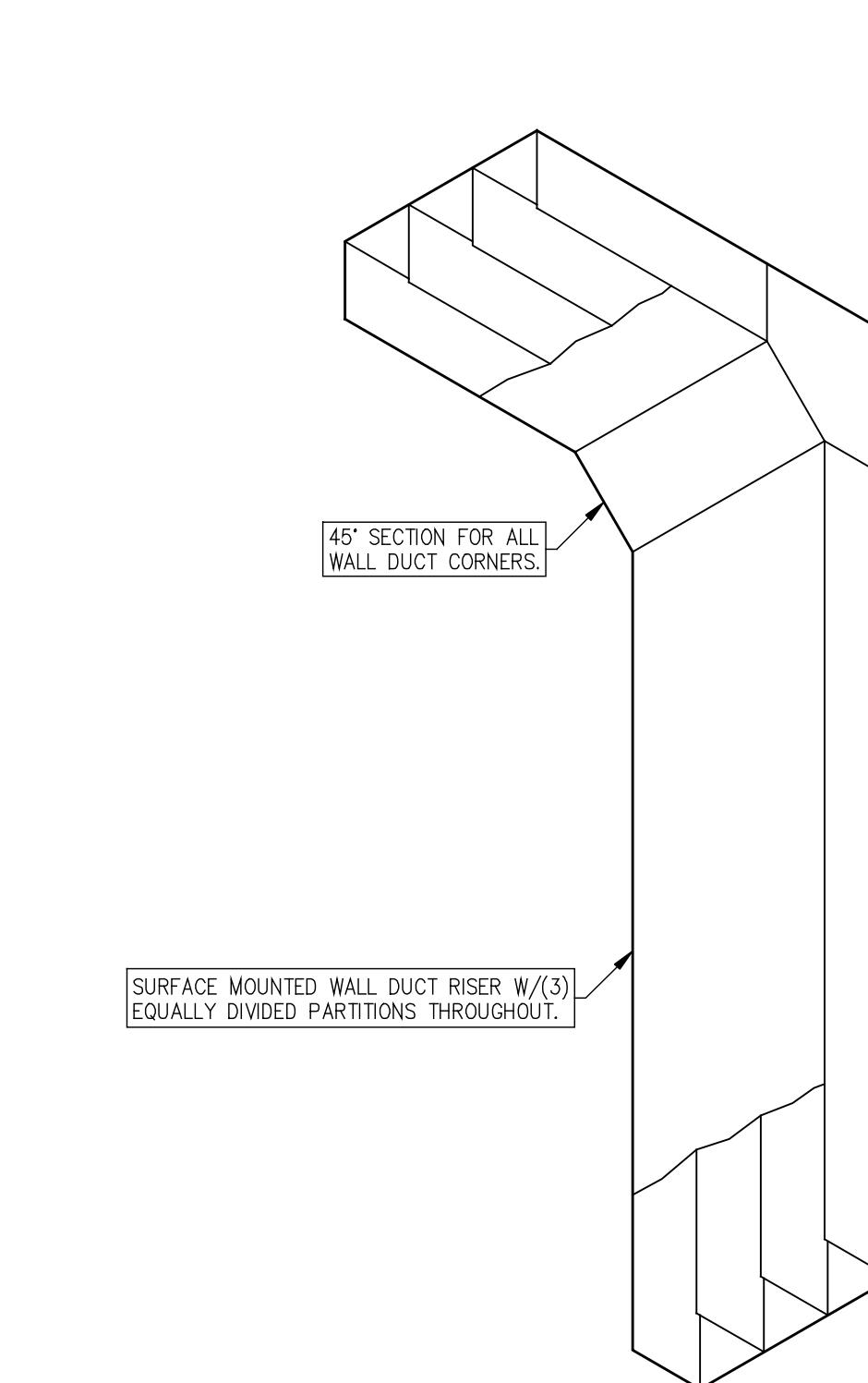
REVISED: 11-30-06

### 4 TYPICAL SURFACE MOUNTED FLOOR DUCT WI "VR"

SCALE: NOT TO SCALE

REVISED: 11-30-06

10" TRENCH DUCT:	A = 10"
18" TRENCH DUCT:	B = 18"
A = 16"	
D = 20"	
24" TRENCH DUCT:	A = 24"
B = 26"	
30" TRENCH DUCT:	A = 30"
B = 32"	



NOTE:  
CUSTOMER'S CONTRACTOR TO VERIFY LOCATION OF J-BOX(ES) FOR CABLE PULL TO WALL DUCT.  
CUSTOMER'S CONTRACTOR TO VERIFY LOCATION OF GROMMETED OPENINGS IN WALL DUCT W/ TOSHIBA REP.

### 8 TYPICAL CEILING DUCT

SCALE: NOT TO SCALE

REVISED: 11-30-06

### TYPICAL DRAWING

(MRI SCAN ROOM – VANTAGE/TITAN)

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DATE: 01-07-08

SCALE: AS NOTED

DRAWN: G.S.P.

QUOTE: N/A

PROJECT NO.

**TYPICALS**

**E5**